# Archaeological Testing at the Las Flores Site CA-SDI-812/H Marine Corps Base • Camp Pendleton California



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The second study was an NRHP evaluation of archaeological deposits at the Las Flores Adobe Ranch House located in Locus B of SDI-812/H. Proposed grading around the perimeter of the historic Las Flores Adobe Ranch House will re-direct rainfall away from the adobe foundation in order to help preserve the structure, but will result in the disturbance of an archaeological deposit surrounding the structure. SAIC personnel excavated forty auger holes and ten excavation units in January 1998 to define the nature, structure, and research potential of the area to be affected. Part II of the present report describes the methods and results of the 1998 investigations at the ranch house.



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# Archaeological Testing at the Las Flores Site CA-SDI-812/H Marine Corps Base, Camp Pendleton California

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# ABSTRACT

This report presents the results of two archaeological investigations at the Las Flores site (SDI-812/H), Marine Corps Base (MCB), Camp Pendleton, California. The first study was an NRHP evaluation of archaeological deposits at the Las Flores site within the Area of Potential Effect (APE) for the Las Pulgas portion of the Sewage Treatment, Transmission and Disposal Project (MCON P-529) in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended. Part I of the present report is based on the field observations, geomorphological study, and technical analyses of cultural material from thirty-eight test units excavated from five different loci of SDI-812/H between October and November of 1995.

The second study was an NRHP evaluation of archaeological deposits at the Las Flores Adobe Ranch House located in Locus B of SDI-812/H. Proposed grading around the perimeter of the historic Las Flores Adobe Ranch House will re-direct rainfall away from the adobe foundation in order to help preserve the structure, but will result in the disturbance of an archaeological deposit surrounding the structure. SAIC personnel excavated 40 auger holes and 10 excavation units in January 1998 to define the nature, structure, and research potential of the area to be affected. Part II of the present report describes the methods and results of the 1998 investigations at the ranch house.

Overall, SDI-812/H contains five loci of archaeological materials, two of which include historic structures currently listed on the National Register of Historic Places (NRHP): the Las Flores *Estancia* and the Las Flores Adobe Ranch House. The Adobe is also a designated National Historic Landmark (NHL). SDI-812/H has a rich history of both prehistoric and historic occupations. Ethnographic and archaeological data indicate that the ethnohistoric Luiseño village of *Huisme* was located in the Las Flores drainage. The Spanish constructed the Las Flores *Estancia* around 1823 as an outpost of Mission San Luis Rey. After secularization in 1834, title to the *Estancia* as well as the land and cattle were given to the Native Americans to form a self-governed Indian Pueblo, but they lost title of the land in 1844 to Pio Pico. Native Americans continued to work at the ranch but most left in the late 1850s. Title was eventually assumed by Pico's brother-in-law, John Forster, who built the Las Flores Adobe Ranch House in 1867. The adobe still stands today and is in use as part of a Boy Scout camp.

The excavations around the ranch house demonstrate that site integrity is relatively poor in Locus B. Modern material was recovered from all excavation units up to a depth of 80 cm. In addition, prehistoric, historic, and modern material is mixed together in most, if not all, of the cultural deposits. The presence of modern debris throughout the soil deposits, extensive signs of bioturbation from all units, and the mixture of historic with prehistoric cultural material demonstrate that soil mixing has been severe. Soil mixing has been caused by rodent and tree root disturbance, historic and modern plowing, ranch house construction-related activities, and modern military and Boy Scout use.

# ACKNOWLEDGEMENTS

The success of the investigations at SDI-812/H was due to the help of a large number of people. The following SAIC personnel participated in the first part of the project, the NRHP evaluation of archaeological deposits at the Las Flores Site, SDI-812/H: Craig F. Woodman, principal investigator and project manager; Chantal Cagle, field director; Leeann Haslouer, crew chief and laboratory supervisor; Brad Stewart, GIS specialist; Cay FitzGerald, graphic artist and cartographer; Karla Green and Shirl Perizzolo, document production specialists; and Forrest Smith, production manager. Crew members participating in the field or laboratory phases of the project include Aaron Bennett, Ethan Bertrando, Jose Castillo, Darrell Cardiff, Robin Crouch, Dustin Kay, Andrew Kinkella, Mark Lindner, David McDowell, Roy Pettus, Laurie Pfeiffer, Megan Stansberry, and Diana Taylor.

Chantal Cagle was the primary author of the *Management Summary* (SAIC 1996b), which served as a preliminary draft of Part I of this report. Dr. Judy Berryman and Dr. Karen Rasmussen served as editors; Craig Woodman directed the preparation of the report and wrote the conclusions; and Leeann Haslouer prepared the discussion of field and laboratory methods. Specialists who participated in the project include geomorphologists Dr. Tom Rockwell and Mitchel Bornyasz, Department of Geological Sciences, San Diego State University; paleobotanist, Phyllisa Eisentraut, University of California, Los Angeles; faunal analyst, Thomas Wake, UCLA Zooarchaeology Laboratory; Robert Lavenberg, Curator and Chair of the Vertebrates section, Natural History Museum of Los Angeles County; historic archaeologists, Dr. Judy Berryman and Tim Hazeltine; and radiocarbon analysis by Beta Analytical, Inc.

The second investigations consisted of an NRHP evaluation of archaeological deposits at the Las Flores Adobe Ranch House, SDI-812/H, Locus B. The following SAIC personnel participated in the Ranch House investigations: Craig F. Woodman, project manager and senior editor; Dr. Karen Rasmussen, principal investigator, senior author, and faunal analyst; Dr. Sean Hess, flake stone analyst; Dr. Judy Berryman, historic artifact and ceramic analyst; Cay FitzGerald, graphic artist; Shirl Perizzolo, document production specialist; Brad Stewart, GIS specialist; Sarah Moore, Illustrator; and Forrest Smith, production manager. Crew members participating in the field or laboratory phases of the project include Karin Anderson, Dr. Judy Berryman, Andrew Kinkella, Laurie Pfeiffer-Craig, Izaak Sawyer, Carol Schultze, and Jason Toohey.

We would like to acknowledge the strong, collaborative support of the following people: Stan Berryman, current Cultural Resource Manager at Marine Corps Base, Camp Pendleton, for his continuing support and assistance; Danielle Huey, Department of the Navy, Navy Facilities Engineering Command, Southwest Division, for her key role in developing the project, defining the scope of work, and providing valuable input and technical review; Dr. Jay Newman, Department of the Army, Fort Worth District, for his excellent contracting support and technical review; and Elizabeth Coahran, former Cultural Resource Manager at Marine Corps Base, Camp Pendleton, for her technical input and review of the preliminary draft.

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# TABLE OF CONTENTS

## PART III — NRHP EVALUATION OF ARCHAEOLOGICAL DEPOSITS AT THE LAS FLORES ADOBE RANCH HOUSE, LOCUS B, CA-SDI-812/H

# LIST OF FIGURES

# LIST OF TABLES

# 1 INTRODUCTION

## 1.1 PROJECT OVERVIEWS

This report presents the results of two archaeological investigations at the Las Flores Site (SDI-812/H), Marine Corps Base (MCB), Camp Pendleton, California (Figure 1-1). The first study was a National Register of Historic Places (NRHP) evaluation of cultural resources within the Area of Potential Effect (APE) for the Las Pulgas portion of the Sewage Treatment, Transmission and Disposal Project (MCON P-529) in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended. These investigations were described in a series of management summaries (SAIC 1995, 1996b). Part I of the present report is based on the field observations, geomorphological study, and technical analyses of cultural material from thirty-eight test units excavated from five different loci of SDI-812/H (Figure 1-2) between October and November of 1995.

The second study was an NRHP evaluation of archaeological deposits at the Las Flores Adobe Ranch House located in Locus B of SDI-812/H. Proposed grading around the perimeter of the historic Las Flores Adobe Ranch House will re-direct rainfall away from the adobe foundation in order to help preserve the structure, but will result in the disturbance of an archaeological deposit surrounding the building. SAIC personnel excavated forty augur holes and ten excavation units in January 1998 to define the nature, structure, and research potential of the area to be affected. Part II of the present report describes the methods and results of the 1998 investigations at the ranch house.

## 1.2 SITE DESCRIPTION

SDI-812/H is approximately 227,005 $m^2$ in area and contains five loci (A-E) of archaeological materials, two of which include historic structures currently listed on the NRHP: the Las Flores *Estancia* and the Las Flores Adobe Ranch House. The Adobe is also a designated National Historic Landmark (NHL).

**Locus A** includes the Las Flores *Estancia*, a Mission Period compound resting on a dense prehistoric/protohistoric archaeological deposit that may be a part of the ethnohistoric Luiseño village of *Huisme*. The site was used initially as a cattle ranch by Mission San Luis Rey (est. 1798), even before construction of the *Estancia* and its chapel around 1823. Although the USGS topographic map and a number of early reports describe the Mission outpost as an *Asistencia*, Las Flores was a lesser *Estancia*, which included a cattle ranch, upgraded chapel, and some liturgical facilities (Schaefer 1992, Section 8, page 2). The site became an Indian Pueblo after Mission

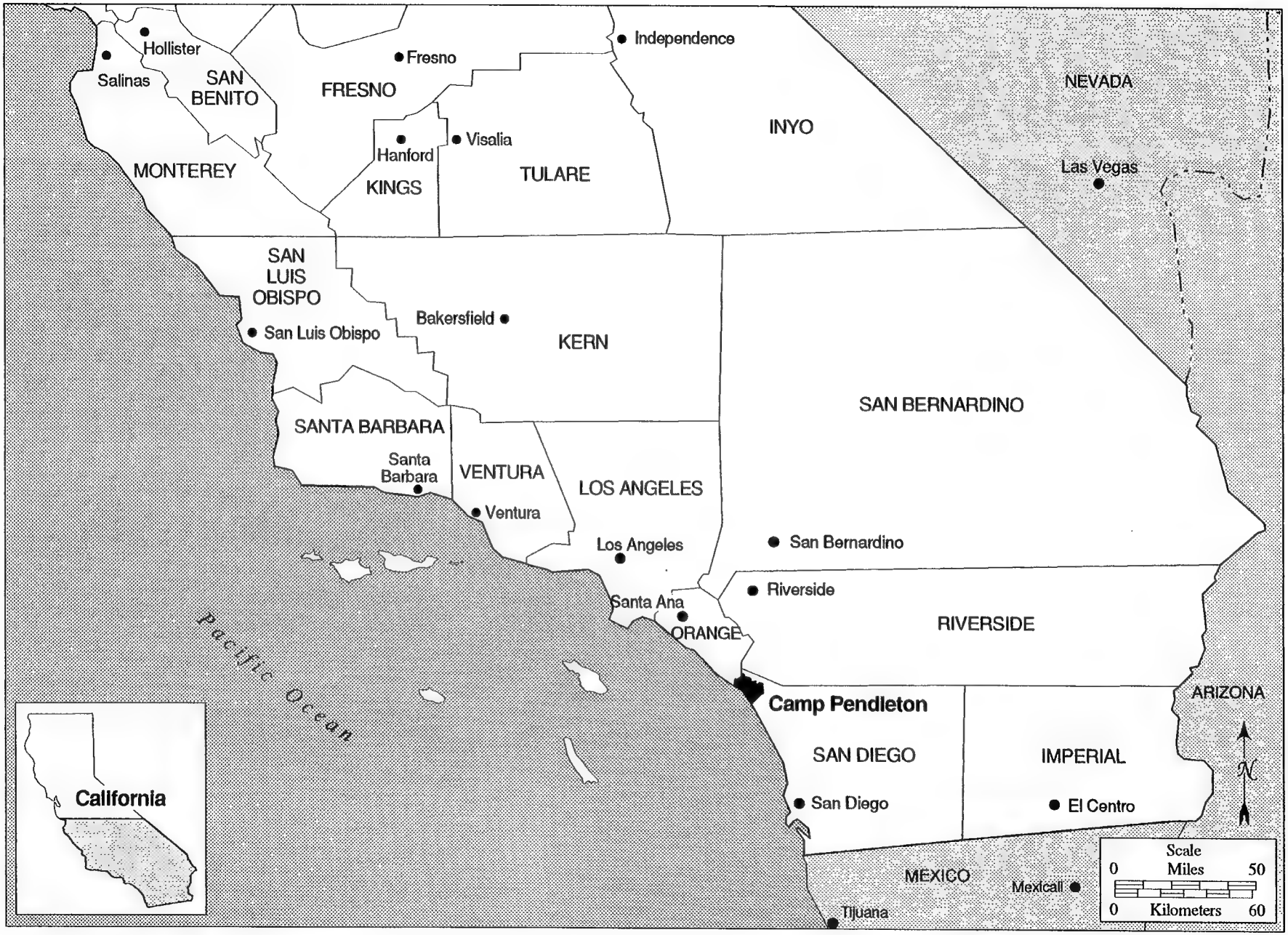



**Figure 1-1. Regional Location of the Project**

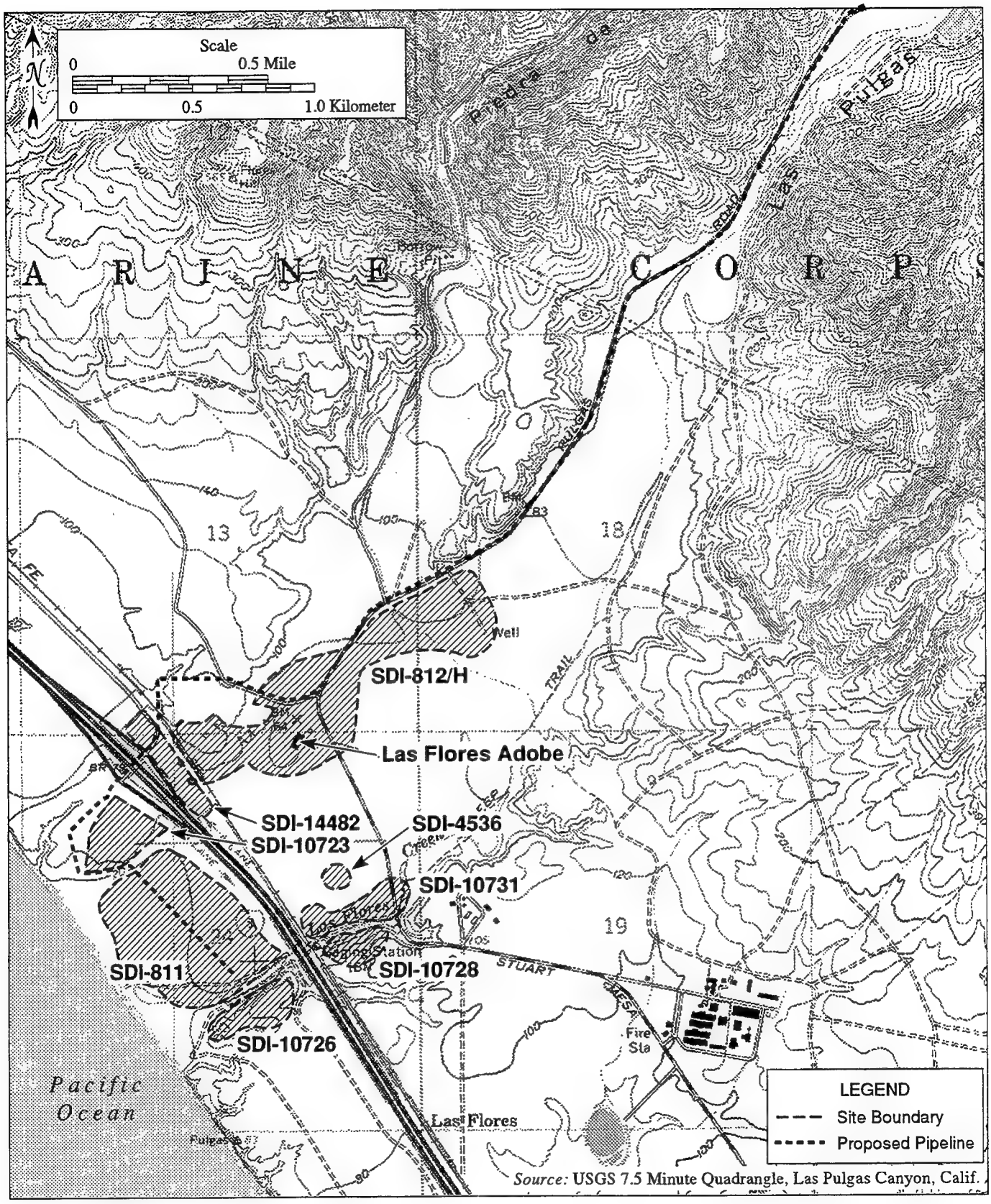



**Figure 1-2. Location of Archaeological Sites and Proposed Pipeline in the Las Flores Creek Area**

secularization (1833), but Pio Pico eventually gained title to the property in 1844. Native Americans continued to reside there but finally left around 1855. Gambling debts by Pico resulted in the later transfer of title to John Forster, who built the Las Flores Adobe Ranch House in 1867.

**Locus B** of the site includes the Las Flores Adobe Ranch House as well as a dense archaeological deposit. The Las Flores Adobe is a California rancho-style house (Figure 1-3) comprised of three adobe-walled structural elements arranged in an elongated "C" around a courtyard (Wee and Mikesell 1991). One element is a two-story "Monterey" style building, measuring 48'6" x 28'8". The second element is a one-story "Hacienda" style building, measuring 107'11" x 17'. The third element is a carriage house measuring 60'6" x 24'. Archival data (Wee and Mikesell 1991) suggests that features such as historic privies and remnants of an early 20th century mess hall may be present (Figure 1-4).

**Loci C-E** are located up the valley and primarily consist of low density, low diversity deposits of marine shell, bone, debitage, and historic and modern debris found within one meter of the ground surface. Stratigraphic testing revealed a deeply buried, high density archaeological deposit in Locus C and demonstrates that buried deposits may occur throughout the valley.

## 1.3 PREVIOUS ARCHAEOLOGICAL EXCAVATIONS AT SDI-812/H

Schaefer (1992) excavated 16 shovel tests in Locus A as part of his updated evaluation of the Las Flores *Estancia* (Figure 1-5). Testing was not conducted northwest of the ruins where soils had been graded down to sterile clay, nor was the inside the *Estancia* compound tested, although Schaefer did note that rodent burrowing within this area had brought cultural materials to the surface, suggesting the *Estancia* was built on an earlier prehistoric site. Each 30 by 30 cm square shovel test was excavated by shovel, hand pick, and trowel and all matrix was screened through 1/8-inch mesh. Schaefer found that the deposit exhibited simple stratigraphy; the upper 10 to 15 cm was a soft dark brown clayey silt characterized by low artifact densities, except in areas near the ruins. Hard clays beneath this upper stratum contained the bulk of the artifacts. Depth of the deposit ranged from approximately 25 to 50 cm and has been somewhat affected by plowing and bioturbation.

The highest artifact densities and the deepest deposits were found northeast of the compound. This area would have been behind the *Estancia*, which Schaefer suggests may have been the most convenient place to discard trash. Materials recovered from the STPs include fragments of fired adobe brick and tile, aboriginal pottery (Tizon Brownware), marine shell, bone, small fragments of groundstone, and a few items of European manufacture, including glass and ceramic fragments and one metal spike (Table 1-1). One small fragment of Ironstone Ware had a blue floral transfer "willow pattern" design that was made by British potters from about 1815, through the Spanish, Mexican, and early American Period, on up to the present (Schaefer 1992, Section 7, pg. 4). The Mexican government prohibited trade with British and American ships, but Fr. Peyri received permission to trade 1,500 hides from Las Flores with the English Frigate *Tomosa Nolan* anchored at San Juan Capistrano. Schaefer (1992, Section 8, pg. 6) suggests the hides may have been exchanged for European trade goods such as the transfer printed ironstone pottery he recovered from his excavations.

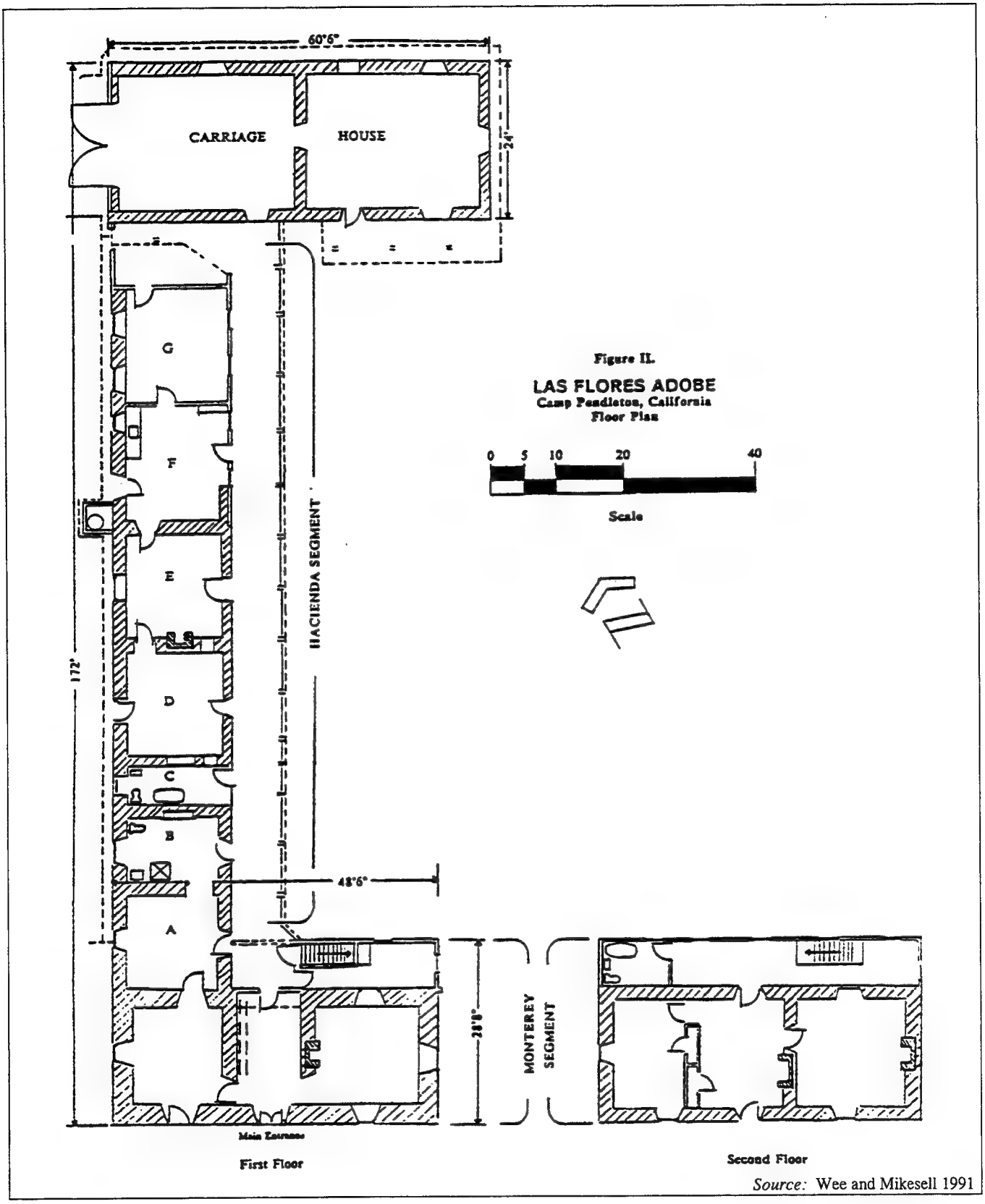



**Figure 1-3. Structural Elements of the Las Flores Adobe Ranch House**

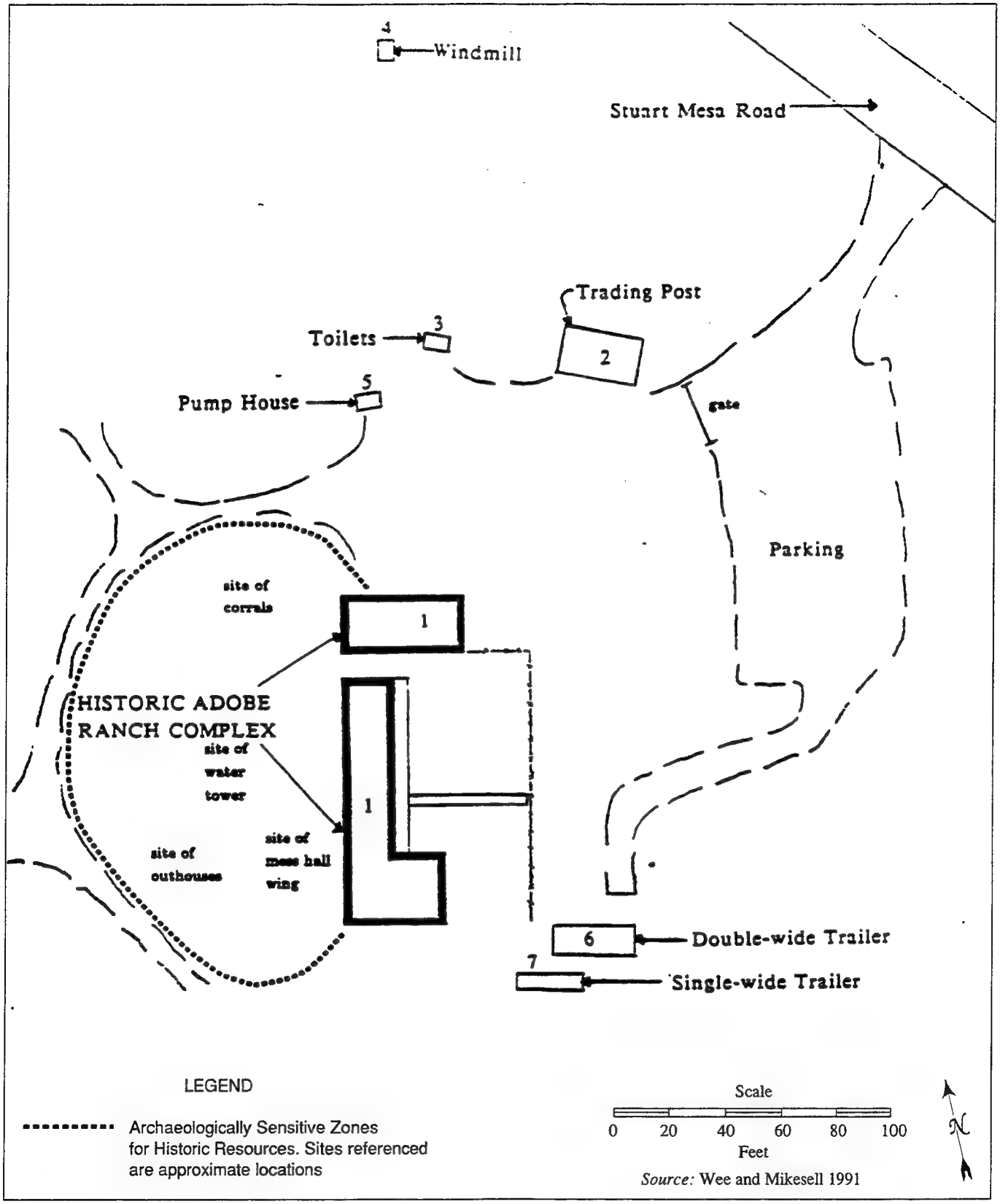



**Figure 1-4. The Historic Adobe Ranch Complex at the Las Flores Adobe Ranch House**

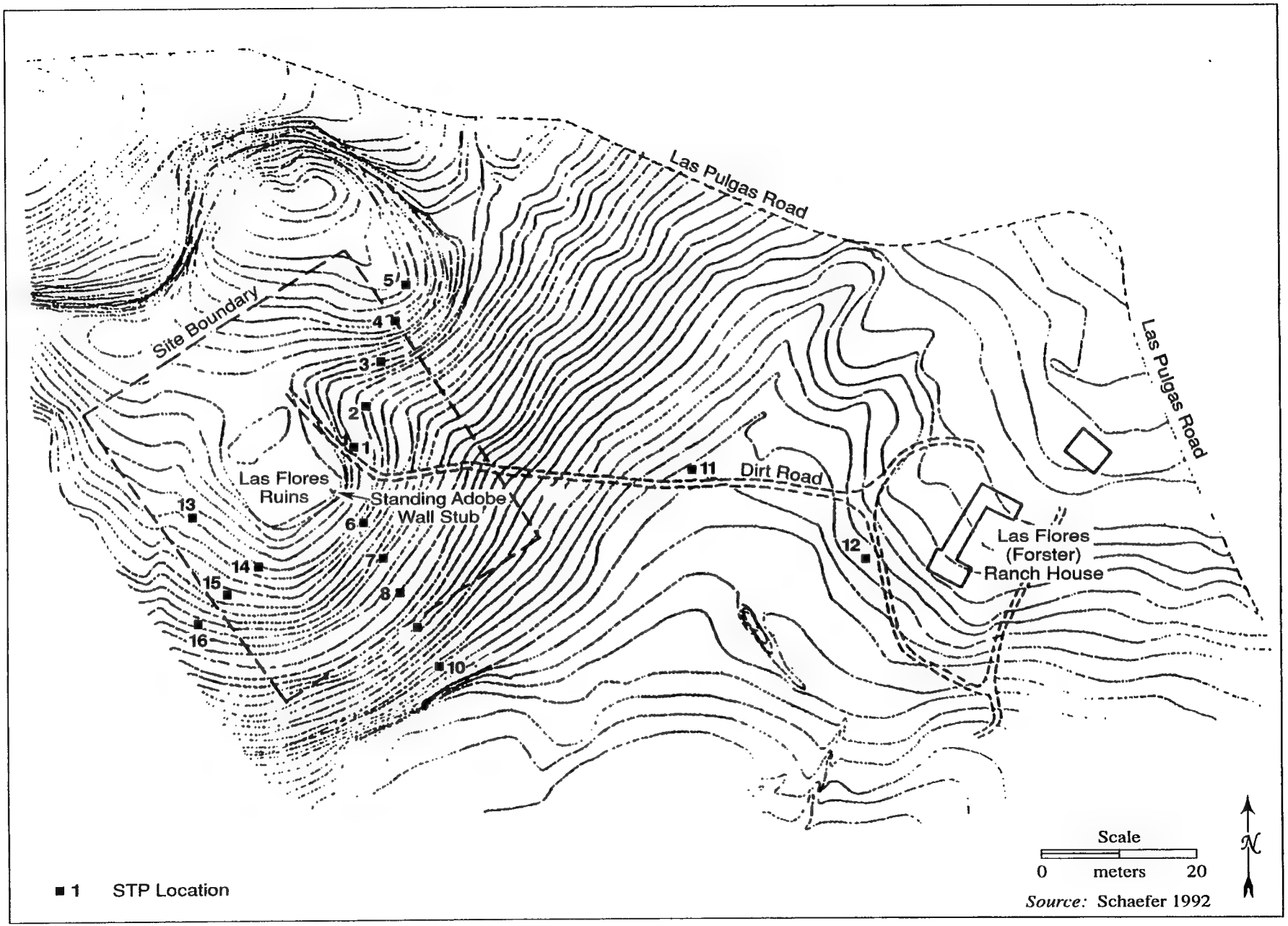



**Figure 1-5. Location of Schaefer's Shovel Test Pit Excavations of SDI-812/H**

**Table 1-1. Results of Schaefer's Shovel Test Excavations at SDI-812/H**

| *STP Number* | *Depth (cm)* | *Fired Terra Cotta (ct)* | *Pottery (ct)* | *Ground-Stone (ct)* | *Fire Affected Rock (ct)* | *Flaked Stone (ct)* | *Shell (g)* | *Bone (g)* | *Glass (ct)* |
|---|---|---|---|---|---|---|---|---|---|
| 1 | >50 | 16 | 5 | 2 | - | 2 | 18.6 | 3.7 | 2 |
| 2 | 43 | 5 | - | 3 | 2 | 1 | - | 1 | - |
| 3 | >35 | 5 | - | 2 | - | 1 | - | - | - |
| 4 | 30 | - | - | 1 | - | - | - | 2.5 | - |
| 5 | 20 | - | - | - | - | - | - | - | - |
| 6 | 40 | 19 | 5 | 2 | | 1 | 3.6 | 5.8 | - |
| 7 | 30 | 7 | - | 2 | 1 | - | 1.3 | - | 1 |
| 8 | 28 | - | - | - | - | 1 | - | - | - |
| 9 | 30 | 2 | - | - | 1 | - | - | - | - |
| 10 | 20 | - | - | - | - | 1 | - | - | - |
| 11 | 15 | - | - | - | - | 1 | - | - | - |
| 12 | 28 | - | - | - | - | 1 | - | - | - |
| 13 | >30 | 10 | 3 | - | - | 1 | - | - | - |
| 14 | 30 | 12 | 1 | 1 | - | - | - | 1.3 | - |
| 15 | 25 | - | - | - | - | 1 | - | - | - |
| 16 | 25 | 1 | 1 | - | - | 1 | - | - | - |

SAIC conducted an intensive surface survey and excavated 60 shovel tests at SDI-812/H (Figure 1-6) as part of a subsurface survey along the proposed APE for the P529 Las Pulgas sewage pipeline on Camp Pendleton MCB in San Diego County between July 18 and August 30, 1995 (SAIC 1996a). The purpose of the extended Phase I investigation was to determine whether potentially intact cultural deposits existed within the APE. In addition to the archaeological excavation, a geomorphological assessment of site disturbance was undertaken.

Shovel test pits (STPs) measured 50 cm in diameter and were excavated in arbitrary 20-cm levels and materials were dry screened through 1/8-inch mesh. Forty-six STPs were excavated within the project APE along both sides of Las Pulgas Road for a distance of approximately 1,300 meters (m). Twelve STPs were excavated from 30 to 150 m northwest of the road near the intersection of Las Pulgas Road and Stuart Mesa Road to assess an alternative pipeline route. The STPs were hand excavated with shovel, pick, and breaker bar to a depth of 1 m, where feasible, at which point additional levels were excavated by a 15-cm diameter hand auger. In addition to the 60 excavated STPs, five STPs (51, 53, 61, 63 and 65) were started but discontinued once the presence of cultural material was confirmed. As a result, no cultural materials were recovered from these five STPs.

The surface survey identified five surface concentrations of cultural material designated as Loci A-E. Fifty-six of 60 excavated STPs contained cultural material, most of which was locally available marine shell. Potentially intact materials were recovered from 18 STPs in surficial as well as buried contexts (see Table 1-2 and Figure 1-6). Materials recovered were dominated by fragments of locally available shellfish remains (mostly *Donax*), with relatively small amounts of bone, Tizon Brownware pottery, fragments of groundstone, fire-affected rock, one biface, one projectile point, one cobble tool, and flaked stone debitage. In addition, more than 100 pieces of undifferentiated historic/modern material (fragments of glass, metal, and plastic) were found. STPs 43 and 44 were located near the *Estancia* and exhibited by far the highest density and diversity of materials.

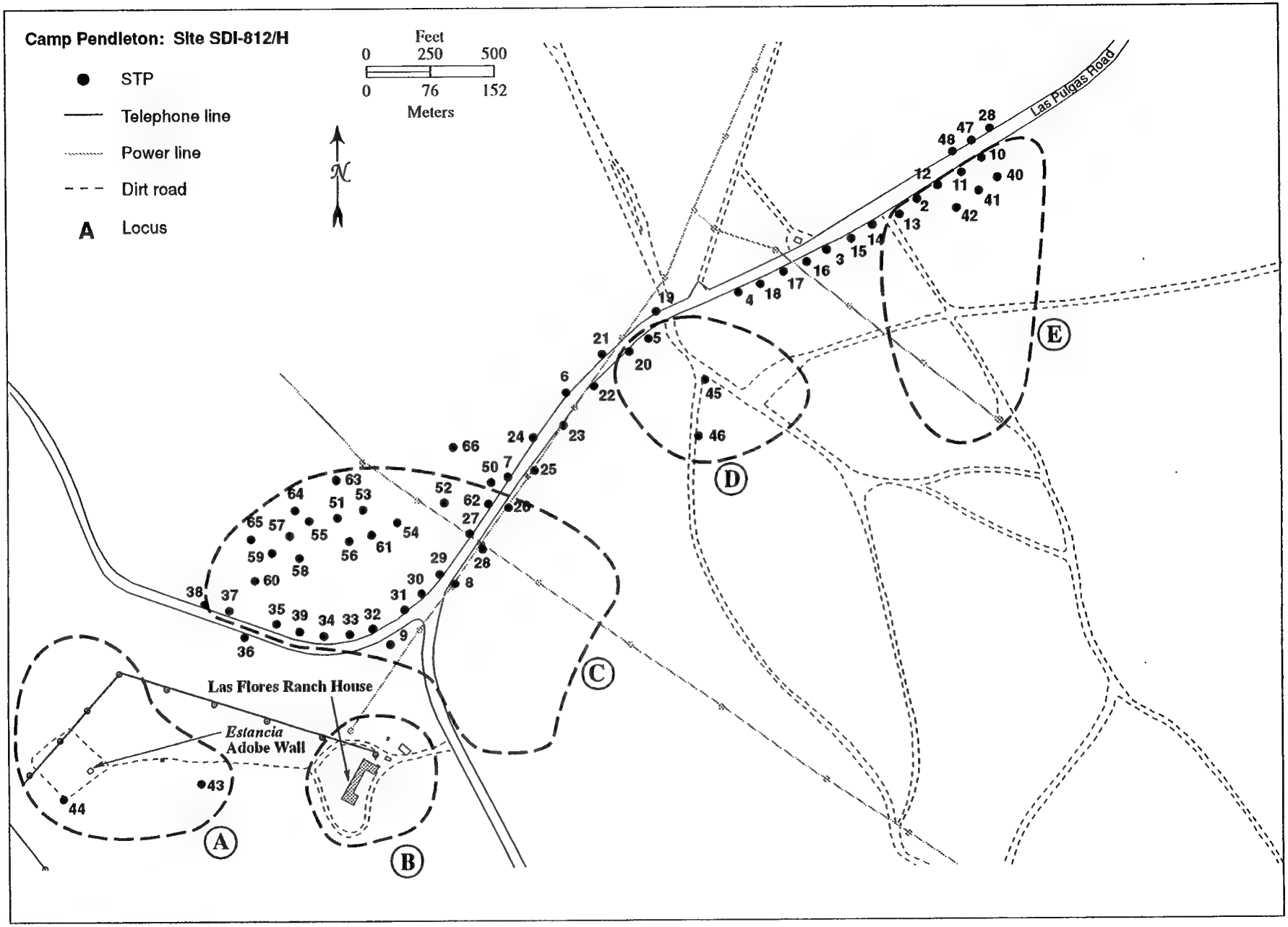


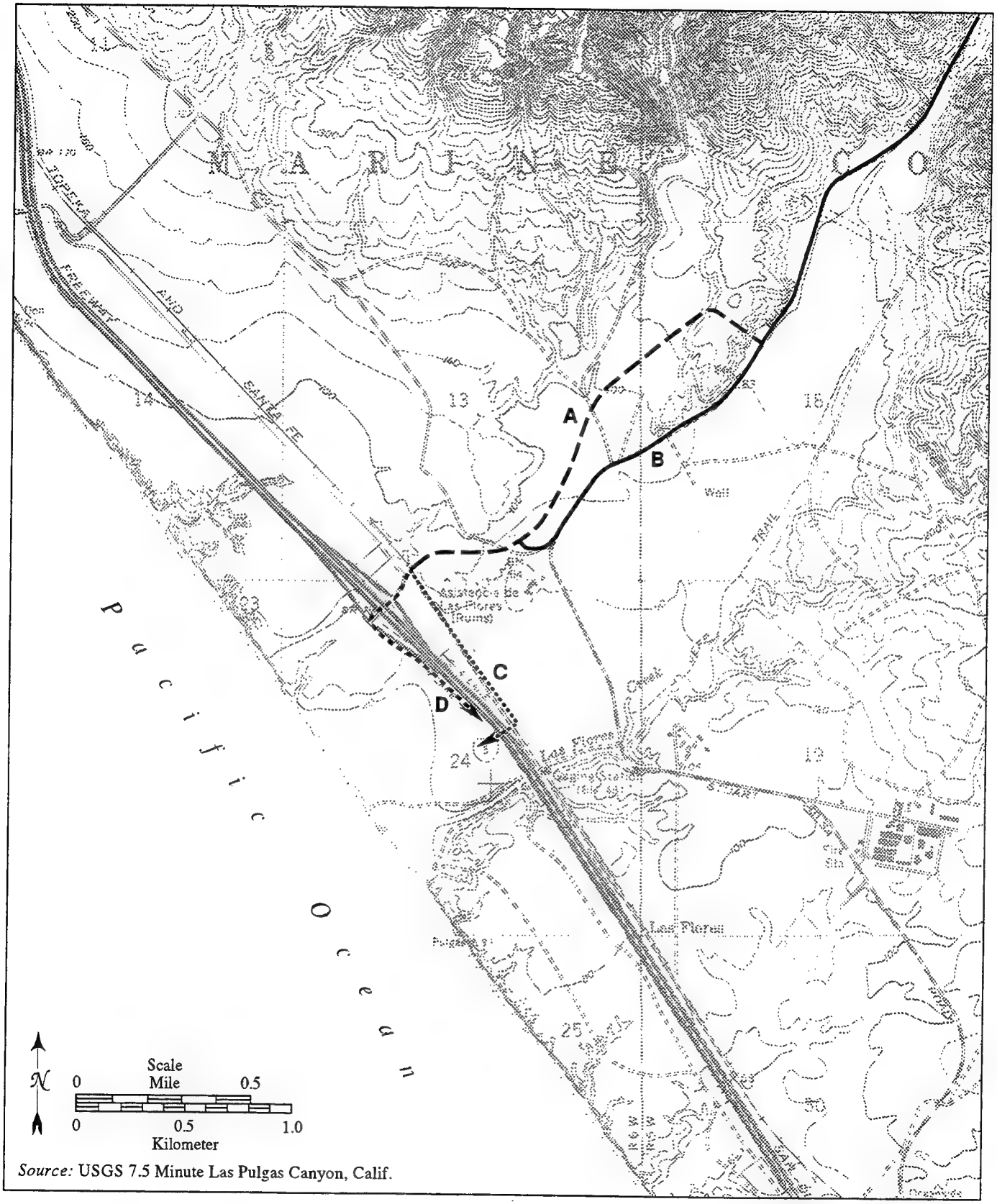

**Figure 1-6. Location of SAIC's 1995 Extended Survey Shovel Test Pit Excavations at SDI-812/H**

**Table 1-2. Results of SAIC's 1995 Shovel Test Pit Excavations at SDI-812/H**

| STP No. | Depth (cm) | Flaked Stone (g) | Shell (g) | Bone (g) | Fire Affected Rock (g) |
|---|---|---|---|---|---|
| STP 10 | 80-120 | 0 | 9.4 | 0.0 | 0 |
| STP 11 | 60-180 | 0 | 252.8 | 0.5 | 61 |
| STP 12 | 20-60 | 1 | 57.8 | 0.1 | 1,137 |
| STP 28 | 80-120 (auger) | 0 | 0.4 | 0.0 | 0 |
| STP 31 | 60-100 | 0 | 1.1 | 0.0 | 0 |
| STP 32 | 60-100 | 0 | 91.1 | 0.0 | 0 |
| STP 33 | 60-120 | 0 | 85.4 | 0.0 | 0 |
| STP 40 | 0-60 | 0 | 3.5 | 0.0 | 0 |
| STP 41 | 20-60 | 0 | 8.5 | 0.0 | 0 |
| STP 42 | 0-80 | 0 | 13.3 | 0.0 | 0 |
| STP 43 | 0-60 | 15 | 899.0 | 15.9 | 579 |
| STP 44 | 0-60 | 6 | 733.0 | 10.2 | 5 |
| STP 52 | 0-40 | 0 | 4.5 | 0.0 | 0 |
| STP 55 | 0-40 | 0 | 0.4 | 0.0 | 0 |
| STP 56 | 0-60 | 0 | 22.3 | 0.0 | 0 |
| STP 57 | 0-20 | 0 | 0.2 | 0.0 | 0 |
| STP 58 | 0-40 | 0 | 160.9 | 0.0 | 0 |
| STP 64 | 0-40 | 0 | 0.1 | 0.0 | 0 |

The results of the extended Phase I indicated that large areas of the site retained good integrity and that pipeline trenching within Las Pulgas Road could affect the site. National Register of Historic Places eligibility evaluation was recommended (SAIC 1996a, 1996c).

The final pipeline route was chosen because it minimizes effects to historic properties. Alternative pipeline route segments A and C (Figure 1-7) were developed after surface survey revealed that the original route (segments B and D) would cross portions of SDI-812/H and SDI-10,723. Subsurface archaeological survey subsequently was conducted to help select the final route (SAIC 1996a). Based on results of the subsurface survey, segment B was selected for construction instead of segment A because the latter (1) would not avoid CA-812/H as it was designed to do, (2) would require a pumping station that would increase construction costs by approximately $300,000, and (3) would require additional maintenance. Alternative C was not selected for construction because, although it would avoid SDI-10,723, it would affect intact deposits at a previously unrecorded site, SDI-14,482, and would require costly boring beneath Interstate 5. Subsurface survey found that segment D could be modified to avoid SDI-10,723 (SAIC 1996a) and the final pipeline route shown in Figure 1-2 reflects this modification.




*Source:* USGS 7.5 Minute Las Pulgas Canyon, Calif.

**Figure 1-7. Alternative Pipeline Routes**

# 2 NATURAL AND CULTURAL ENVIRONMENT

## 2.1 NATURAL ENVIRONMENT

### Location

SDI-812/H is located on Camp Pendleton in northern San Diego County, California. The site is situated on the flank of a broad coastal valley in the lower reaches of Las Pulgas Canyon (Figure 2-1), within 0.5 mile from the Pacific Ocean. It is located at an elevation ranging from approximately 50 to 100 feet above mean sea level.

### Geology

The project area is located on the northwest margin of the coastal valley cut by Las Pulgas, Las Flores, and Piedra de Lumbre Creeks. The valley is generally a broad, flat plain in its lower reaches and branches into steep-sided tributary canyons as it enters the San Onofre Mountains approximately 1.0 mile from the coastline. Along the coastal plain, the valley is bordered by marine terraces forming broad, flat elevated surfaces cut by valleys or canyons. The coastal plains form a series of Quaternary terrace surfaces cut into the Monterey Formation and San Mateo member of the Capistrano Formation. These formations are considered to be Middle Miocene to Late Miocene-Early Pliocene in age and are composed of sandy siltstone to mudstone and sandstone to a sandy conglomerate (Ehlig 1977). Capping the terraces and within the valley bottom are Quaternary marine and non-marine deposits (Moyle 1973). Terrace deposits consist of poorly stratified sand and sandy pebble to cobble gravel deposits. Valley fill deposits consist of unconsolidated silt, sand, and sandy pebble to cobble gravel (Bornyasz 1995).

Deposits within the site vicinity include the valley floor and floodplain, the terrace surfaces, and the terrace-to-valley slopes. Site-specific geology and soils stratigraphy are detailed in Appendix A of the Management Summary (SAIC 1996b).

### Climate

Present day climatic conditions in the project area are typical of those of the southern California coast (Maxwell 1994; Palmer 1990). The climate is classified as xeric, with cool, wet winters and warm, dry summers. Average precipitation in the coastal zone is 32 cm per year, and the mean annual temperature ranges from 15 to 22 degrees Celsius. Based on historical observations, variability of precipitation and temperature appear to be moderately high over the time period of decades to centuries. Winter storms (November to April) account for the majority of rainfall, with

the balance due primarily to occasional precipitation related to summer tropical storms. During winter precipitation events, the frequency of storms and storm strength directly influence flood stage (peak) flow within the local creeks. Hence, these drainages have low base-flow and high peak discharge. Seasonal coastal fog is common, as are moderate afternoon onshore breezes.

**Vegetation**

Modern plant communities in the project area include grassland, chaparral, oak savanna, coastal sage, limited riparian, and improved areas (Hickman 1993; Munz 1974; Palmer 1990). Grassland composed of native perennial bunch grasses and non-native Mediterranean grasses predominates at SDI-812/H. The wide variety of locally-accessible plant communities would have provided Native Americans with a number of plants useful for food, medicine, and crafts. Economically important plants noted in historical accounts include oaks, sage, wild oats, wild peas, wild rose, and wild mustard, among others (Brian F. Mooney Associates 1994:41-42).

**Fauna**

Native fauna typical of the project area include a variety of terrestrial, coastal, and marine species representing the broad range of environmental zones accessible from SDI-812/H. These include mammals of the coastal sage scrub/grassland ecozone, such as ground squirrel, pocket gopher, rabbits, badger, deer, and possibly mountain lion. Quails and migratory waterfowl as well as sea birds might be expected. Marine fauna typical of the area include coastal invertebrates, such as bean clam, mussels, and abalone, rocky shore and kelp-bed dwelling fishes, and possibly sea mammals such as seals and sea otters. A more detailed list of contemporary mammals living in the Northern San Diego County area, based on the range maps compiled by Jameson and Peeters (1988), is provided in Table 2-1.

**Paleoecological Reconstruction**

The Holocene era has been a time of rapid change in terms of the structure of paleocoastlines and the representation of local flora and fauna. The rapid sea level rise during the Late Pleistocene and Early Holocene created mainly rocky shorelines along the coastal zone of Camp Pendleton (ASM Affiliates 1996; Inman 1983). When the rate of the rising ocean slowed during the last 4,000 years, large expanses of sandy beach replaced most of the rocky shorelines (Inman 1983). The abundance of many types of fish and shellfish would have changed depending on what habitats were available along the local shoreline. For example, archaeological sites in the area demonstrate the prevalence of *Donax* exploitation during the Late Holocene, but not before (SAIC 1998). *Donax* thrives in sandy-shore habitats and, according to paleocoastline reconstructions, would not have become well established along Camp Pendleton until sometime after 4,000 years ago (ASM Affiliates 1996:70).

In addition to changes in the structure of the coastline, palynological studies in the Las Pulgas Canyon have demonstrated considerable change in the local plant communities over the last 4,000 years (ASM Affiliates 1996). Pollen evidence from the Las Flores Creek profile indicates that wetter conditions prevailed near the end of the Middle Holocene (Anderson 1996). These


**Figure 2-1. View up Las Pulgas Canyon from *Estancia* Ruins at SDI-812/H**

**Table 2-1. Contemporary Mammals of Northern San Diego County**

**Cervidae** (Deer)
*Odocoileus hemionus* (Mule Deer)
**Canidae** (Dogs, Foxes)
*Canis latrans* (Coyote)
**Felidae** (Cats)
*Felis concolor* (Mountain Lion)
**Mustelidae** (Weasels, Martin)
*Mephitis mephitis* (Striped Skunk)
*Mustela frenata* (Long-tailed Weasel)
*Spilogale putorius* (Spotted Skunk)
**Procyonidae** (Raccoons and Coatis)
*Bassariscus astutus* (Ringtail Cat)
*Procyon lotor* (Raccoon)
**Phyllostomidae** (Leaf-nosed Bats)
*Macrotus californicus* (CA Leaf-nosed Bat)
**Vespertilionidae** (Vesper Bats)
*Antrozous pallidus* (Pallid Bat)
*Euderma maculatum* (Spotted Bat)
*Plecotus townsendii* (Townsend's Bat)
**Molossidae** (Free-tailed Bats)
*Eumops perotis* (Western Mastiff Bat)
*Nyctinomops femorosaccus* (Free-tailed Bat)
**Soricidae** (Shrews)
*Notiosorex crawfordi* (Desert Shrew)
*Sorex ornatus* (Ornate Shrew)
**Talpidae** (Moles)
*Scapanus latimanus* (Broad-footed Mole)
**Leporidae** (Rabbits and Hares)
*Lepus californicus* (Black-tailed Jackrabbit)
*Sylvilagus audubonii* (Audubon's Cottontail)
*Sylvilagus bachmani* (Brush Rabbit)
**Equidae** (Horses)
*Equus asinus* (Burro)—introduced
*Equus caballus* (Horse)—introduced
**Otariidae** (Sea Lions)
*Zalophus californianus* (California Sea Lion)
**Phocidae** (Seals)
*Phoca vitulina* (Harbor Seal)
**Arvicolidae** (Voles)
*Microtus californicus* (CA Meadow Vole)
**Sciuridae** (Squirrels)
*Sciurus griseus* (Western Gray Squirrel)
*Spermophilus beecheyi* (CA Ground Squirrel)
**Geomyidae** (Pocket Gophers)
*Thomomys bottae* (Botta's Pocket Gopher)
**Heteromyidae** (Kangaroo Rats, etc.)
*Dipodomys agilis* (Pacific Kangaroo Rat)
*Perognathus californicus* (CA Pocket Mouse)
*Perognathus fallax* (San Diego Pocket Mouse)
*Perognathus longimembris* (Pocket Mouse)
**Cricetidae** (Deer Mice, Wood Rats)
*Neotoma fuscipes* (Dusky-footed Wood Rat)
*Neotoma lepida* (Desert Wood Rat)
*Peromyscus boylii* (Brush Mouse)
*Peromyscus californicus* (Parasitic Mouse)
*Peromyscus eremicus* (Cactus Mouse)

Scientific nomenclature taken from Jameson and Peeters 1988.

wetter conditions allowed cypress (*Cupressus*) or a similar type tree to thrive in the area, perhaps in a riparian environment. Approximately 2,600 years ago, various herbs colonized the area around the same time that the tree population appears to decline, suggesting an end to wetter climatic conditions. During the modern period, there was an influx of numerous non-native species, which replaced many indigenous plant communities (ASM Affiliates 1996).

Overall, the various paleoecological changes during the Holocene would have had profound effect on the local hunters and gatherers because the types of flora and fauna available in the local region would have varied depending on the structure of local habitats at the time.

## 2.2 CULTURAL SETTING

**Prehistory of Camp Pendleton Area**

Various cultural sequences (Figure 2-2) have been defined for coastal California and San Diego County (e.g., Bull 1987; Ezell 1987; Moriarty 1966; Warren 1987), but none have been refined specifically for the Camp Pendleton region (Reddy and Byrd 1997). For consistency, this report will rely on a terminological sequence—Paleoindian, Archaic, Late Prehistoric—employed during other recent investigations in the Las Flores Creek locality (e.g., ASM Affiliates 1996, 1997; SAIC 1996b, 1998); however, our absolute dates for the three periods differ from some of the previous reports (i.e., ASM Affiliates 1996, 1997).

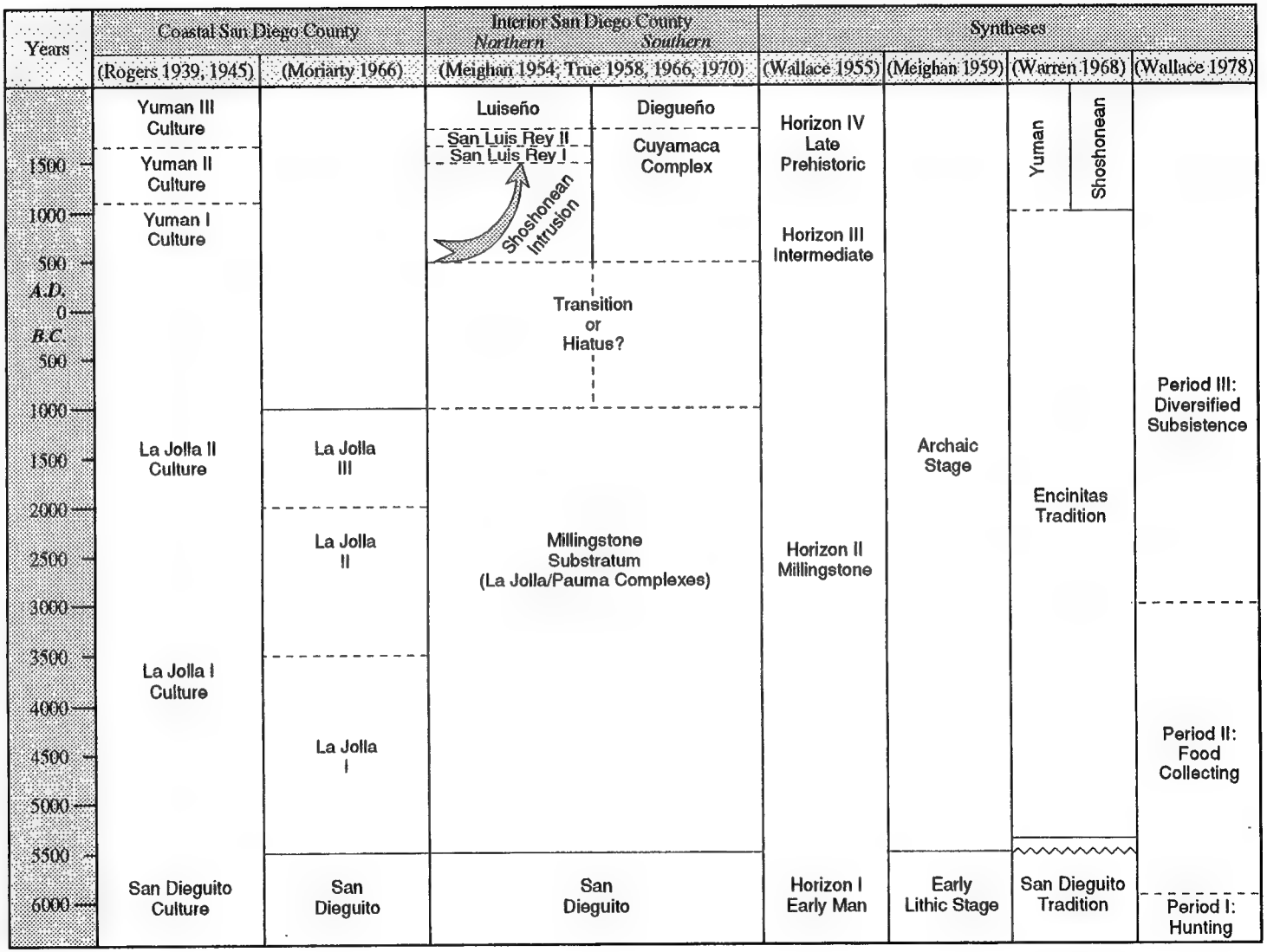
*Paleoindian Period*

The Paleoindian period, also known as the San Dieguito complex, dates from ca. 12,000 to 8,000 years before present (B.P.) and is typified by artifact assemblages consisting of typical hunter-gatherer flaked lithic tools, such as scrapers, scraper planes, choppers, and large projectile points (Davis et al. 1969; Moratto 1984; Warren 1987). A cooler and wetter climate during this period resulted in more wide-spread pinion-juniper and riparian plant communities. Sites occupied during this time suggest that the hunting of deer and smaller mammals was central to the San Dieguito economy. Typical Paleoindian assemblages do not contain millingstone technology.

Although no consensus has been reached among archaeologists, recent information suggests that the San Dieguito complex may have evolved into the La Jolla complex or Archaic Period between about 9,000 and 8,000 years B.P. (Erlandson 1994). This transitional period is supported by the presence of artifacts such as eccentric crescents and spire-ground *Olivella* beads in both complexes. One site that appears to demonstrate this relationship is SDI-210, a multi-component midden site located south of Carlsbad on the north shore of Agua Hedionda Lagoon (Moriarty 1967). In the upper levels, the nearly 2 m deep midden contained milling tools attributed to the La Jolla Complex. No millingstones were found below 130 cm, but scrapers, choppers, and hammerstones typical of the La Jolla Complex were found throughout all levels of the midden and the soil profile exposed a homogeneous deposit lacking obvious stratification. A sample of shell from the base of the midden returned a radiocarbon date of 9020 ± 500 RYBP.

*Archaic Period*

The Archaic period (La Jolla complex) lasted until approximately 2,000 years before present. During this period the subsistence focus changed from generalized hunting and gathering to increased reliance on marine resources (primarily shellfish and fish). The majority of the La Jollan sites are located along the coast and major drainage systems extending inland and are characterized by the appearance of millingstone technology (basin metates and manos), shell middens, cobble tools, discoidals, a small number of Pinto and Elko series points, and flexed burials.




*Source:* Moratto 1984:158

**Figure 2-2. Prehistoric Cultural Chronology for the San Diego Region**

### *Late Prehistoric Period*

The Late Prehistoric period is characterized by the introduction of ceramics and changes in burial traditions and lithic technology. Flexed inhumations are replaced with cremation burials, and small pressure-flaked projectile points make an appearance. There is a shift from littoral resource exploitation to an emphasis on inland plant (especially acorns) food collection, processing, and storage. These changes are believed to be associated with a migration of Yuman-speaking people from the eastern Colorado River region around 2,000 B.P. (Rogers 1945) and Shoshonean speakers after 1,500 B.P. (Moratto 1984; True 1966). During this period, inland semi-sedentary villages were established along major water courses, and mountain areas were seasonally occupied to exploit acorns and piñon nuts.

In the northern part of San Diego County, the Late Prehistoric period is represented by the San Luis Rey complex (Meighan 1954; True et al. 1974), which is considered to represent the Shoshonean predecessors of the ethnohistoric Luiseño. The San Luis Rey complex is divided into two phases: San Luis Rey I, a preceramic phase lasting from ca. A.D. 1400-1750 (Meighan 1954; True et al. 1974) and San Luis Rey II, a ceramic phase correlating with the ethnohistoric period between A.D. 1750-1850 (Meighan 1954). The San Luis Rey II complex differs primarily in the appearance of cremation urns, ceramics, and red and black pictographs. Ceramics may have entered into the San Diego region as early as ca. A.D. 1200-1600 (True et al. 1974), but did not become common until the ethnohistoric period. In the southern portion of San Diego County, the Late Prehistoric period is characterized by the Cuyamaca complex (Moratto 1984), which shares many traits with the San Luis Rey complex. The Cuyamaca differs from the San Luis Rey complex in some of their mortuary practices, such as separating cemeteries from residential areas and the use of grave markers, as well as the presence of a steatite industry and numerous millingstones (True 1970).

### Ethnography of the Camp Pendleton Area

A wide range of historical, ethnohistorical, and ethnographic sources provide an outline of the ethnohistory of the Camp Pendleton region. Historical documents include the sacramental and census registers (*padrones*) of the Franciscan Missions as well as various documents from early explorers (e.g., Bolton's 1927 translation of the Crespí diary of the Portolá Expedition). A large body of ethnographic and ethnohistorical sources provide information on a wide range of topics including settlement, subsistence, social organization, population size, and cosmology of the people who lived in the Camp Pendleton region when the Spanish arrived (e.g., Bean and Shipek 1978; Earle and O'Neil 1994; Harrington 1933, 1986; Kroeber 1925; McCawley 1995, 1996; Rivers 1991; Sparkman 1908). Camp Pendleton has completed the first stage of a comprehensive ethnohistoric study (Johnson 1998).

### *Cultural Affiliation*

According to Kroeber's study (1925), Camp Pendleton straddles the boundary between the Native American Luiseño and Juaneño cultural groups (Figure 2-3). Both are Shoshonean speaking populations that inhabited what is now northern San Diego, southern Orange, and southeastern Riverside counties.

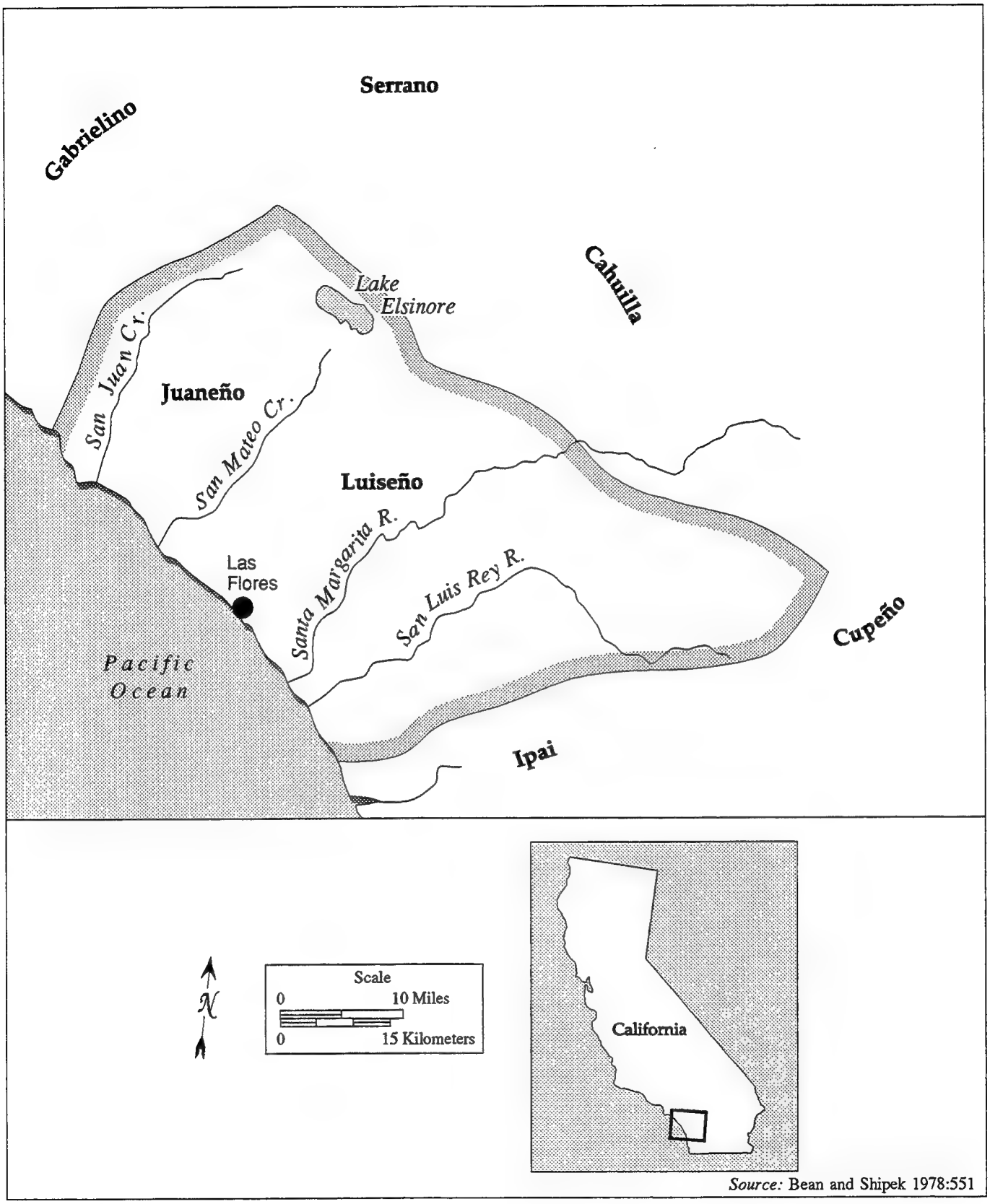



**Figure 2-3. General Boundary of Ethnographic Groups**

The Shoshonean inhabitants of northern San Diego County were called Luiseños by Franciscan friars, who named the San Luis Rey River and established the San Luis Rey Mission in the heart of Luiseño territory. Their territory encompassed an area roughly from Agua Hedionda Creek north to Aliso Creek on the coast, and inland to Santiago Peak and Palomar Mountain (Bean and Shipek 1978). The Luiseño shared boundaries with the Gabrielino and Serraño to the north and northwest, the Cahuilla from the deserts to the east, the Cupeño to the southeast, and the Ipai or Kumeyaay to the south. All but the Ipai are linguistically similar to the Luiseño, belonging to the Takic subfamily of Uto-Azetecan (Bean and Shipek 1978).

Luiseño inhabitants of the Las Flores area were associated with the *Howak* lineage (Strong 1929:275-76). Grijajalva's report of Fr. Juan Mariner's 1795 expedition mentioned *Churnelle* and *Quesinelle* as two Luiseño villages in the Las Flores area (Englehardt 1921:6; cited in Schaefer 1992), and the circa 1815 Mission San Luis Rey *Padron* specifically mentions neophytes from the Las Flores village of *Huisme*, which Sparkman recorded as *Ushmai* (Schaefer 1992, Section 8, pg. 1).

Less is known about the Juaneño, whose name derives from an association with the Mission San Juan Capistrano, founded in 1776. The territory ascribed to them by Kroeber extended from Aliso Creek on the north to the area between San Onofre and Las Pulgas drainages on the south, with the Pacific Ocean forming the western boundary and the crest of the Santa Ana Mountains forming the boundary on the east. Their neighbors on the east were the Gabrielino, and the Luiseño bordered them on the east, northeast, and south.

There is some controversy over the nature of the Juaneño as a group. Kroeber recognized Juaneño as a dialect of Luiseño, but treated the populations as separate peoples. Cameron (1987) supports this interpretation based on archaeological evidence, but Bean and Shipek (1978) and White (1963) treat the Juaneño as part of the Luiseño on the basis of cultural and linguistic similarities.

*Social and Settlement Organization*

The Luiseños were divided into several autonomous lineages or kin groups based on a patrilineal and patrilocal social system. The lineage represented the basic political unit among most southern Californian Indians. The exact nature of settlement dynamics of the Luiseño is still debated. According to Bean and Shipek (1978), the Luiseño exploited a wide range of resources in a bi-modal seasonal system. Most inland groups had fishing and gathering sites on the coast that they visited annually when the tides were low or when inland foods were scarce from January to March. The mountain camp was occupied by most of the village population during October and November when acorns were harvested and game animals hunted. Each lineage had exclusive hunting and gathering rights in their procurement ranges and trespassers were seriously punished (Bean and Shipek 1978).

It has also been suggested that coastal Luiseño and Juaneño groups stayed along the seashore the entire year instead of utilizing the bi-modal system discussed above (Koerper 1981). Alternatively, Shipek (1977) suggests that during ethnohistoric times the Luiseño occupied permanent villages in a variety of ecological zones and made seasonal forays to procure specific resources from particular localities.

True and Waugh (1982) describe a diachronic model of settlement and subsistence change during the Late Prehistoric period of Luiseño occupation. They suggest that settlement patterns during

approximately A.D. 1 to A.D. 1500 were characterized by small, briefly occupied campsites located in a variety of locations, a classic indication of what is now called a foraging strategy. After A.D. 1500, they suggest that settlement patterns became more territorial, focused on specific drainages, and reflect a collector-oriented strategy. Sites included permanent villages in the western foothills and permanent summer camps in the mountains.

Finally, Graham's (1981) model was proposed for Late Prehistoric Kumeyaay rather than Luiseño, but the fusion-fission dynamics of his model are relevant here. In his study area, he sees population aggregation in the mountains during summer and autumn to collect and store seasonally available grass seeds and acorns. Aggregation gives way in the winter as small groups move to the desert to forage for patchier, less abundant resources. This model suggests that Late Prehistoric groups practiced collecting as well as foraging strategies in response to seasonal variations in resource abundance and availability.

*Subsistence Patterns*

Acorns were an important food source to the Luiseño and Juaneño groups, as they were with most inland communities of Takic-speakers in southern California. Acorns were collected in the fall and then stored in either conical shaped granaries or in ceramic storage pots (McCawley 1995). It is unclear how important acorns were to the coastal inhabitants, but many researchers believe that these nuts may have composed up to 25 percent of the diet (Bean and Shipek 1978; Earle and O'Neil 1994; White 1963). In the case of the Las Flores Creek study area, records from the 1769 Portolá expedition report some oak groves within the Las Pulgas Canyon (Earle and O'Neil 1994 from Bolton 1927). In addition, the coastal groups may have visited more interior areas during harvest time or may have exchanged goods with more inland residents in order to acquire enough acorns for the community.

Besides acorns, people utilized various seeds, greens, bulbs, roots, and fruits. This includes a wide variety of cacti and even edible reeds. The greens may have been an important springtime food, when other supplies were relatively scarce. Edible reeds could have provided a supplementary resource during food scarcity, such as late winter. Bean and Shipek (1978) believe seeds provided a large bulk of the nutritional needs of the people. They mention the use of grass seeds, manzanita, sunflower, sage, chia, lemonade berry, wild rose, holly-leaf cherry, prickly pear, lamb's-quarters, and pine nuts.

The Luiseño hunted large and small terrestrial game, including black-tailed deer, antelope, jack rabbits, rabbits, various birds, grasshoppers, and rodents. Deer were hunted with bow and arrow, captured in snares, or driven off cliffs (McCawley 1995). Smaller mammals, such as the rabbits and rodents, were hunted with bow and arrows, throwing sticks, snares, traps, and draw nets. McCawley (1995) lists a series of animals that were not eaten by the Luiseño during pre-mission times. This list includes tree squirrels, wild pigeons or doves, dogs, coyotes, foxes, wolves, badgers, skunks, raccoons, wildcats, gophers, moles, eagles, buzzards, crows, hawks, owls, mockingbirds, lizards, snakes, rattlesnakes, turtles, tortoises, frogs, and toads.

Fish and other marine animals obviously played an important dietary role to the people living along the coast. Fishing equipment included bone and shell fishhooks, yucca fishing line, and detachable-point harpoons (McCawley 1995). In addition, coastal groups used dugout or rush bundled canoes (Earle and O'Neil 1994; Harrington 1986; McCawley 1995). Such crafts would have given the coastal inhabitants access to off-shore fishing grounds. In addition to fish, the

coastal groups subsisted off of a wide variety of locally available shellfish, marine mammals, and crustaceans (Bean and Shipek 1978).

**Historical Period of the Camp Pendleton Area**

*Overview*

First contact between the Europeans and the Luiseño came in 1769 with the arrival of Gaspar de Portola's expedition. The expedition was traveling between San Diego and Monterey in order to investigate possible Mission sites (Rivers 1991).

Mission San Juan Capistrano was established in 1776, the seventh of California's twenty-one missions. Mission San Luis Rey was founded 22 years later as the 18th mission (Rivers 1991). By 1830, the holdings of Mission San Luis Rey included San Onofre, Santa Margarita, San Marcos, Pala, Temecula, San Jacinto, Agua Caliente, and Las Flores (Brigandi 1982, revised 1995).

It has been estimated that there were 50 Luiseño villages each with a population of about 200 people at the time of contact (White 1963) for a total population of 10,000. The mission records register 3,683 Luiseño in 1828 (Bean and Shipek 1978), indicating a drastic decrease. The actual number of Luiseño may have been greater, since the records would miss those not assimilated into the mission system. Nevertheless, the decline is notable and due in large part to the spread of European diseases and the living conditions at the missions and *ranchos*.

Indians brought into the mission system were taught the Roman Catholic faith, Spanish language, farming skills, animal husbandry, adobe brickmaking, carpentry, and other European crafts (Bean and Shipek 1978). The policy at Mission San Luis Rey was to maintain the Luiseño settlement pattern, and the priest visited the villages to hold masses, perform marriages, and supervise agricultural activities. Traditional economic methods continued as the basic subsistence mode and leadership continued for the most part as it had always been.

In 1834, the missions were secularized, resulting in political imbalance and Native American revolts and uprisings against the Mexican *rancheros* who used the local populations as serfs. In theory, this secularization was supposed to act as a transition from mission-controlled to Indian-controlled pueblos (McCawley 1996). This would also allow the missions to continue developing new territories in more inland areas while leaving the "christianized" Native Americans in charge of their original holdings. In reality, the secularization movement allowed self-aggrandizing individuals, mostly Mexican citizens, to control the wealth of vast amounts of lands. By 1845, Pio Pico, temporary governor of California and last governor of Mexican California, and his family acquired over 133,000 acres of land, including San Onofre, Santa Margarita, and Las Flores (Rivers 1991).

At this time, many Luiseño left the missions and sought refuge among inland groups while a few acquired land grants and entered into the mainstream Mexican culture. Several local pueblos were established for some of the San Luis Rey *rancherías*, among them Santa Margarita and Las Flores by the Mexican government. These pueblos were intended to be governmental units within the Mexican political system. Most disappeared, like Las Flores and Santa Margarita, under Mexican *rancho* rule.

### *The Mission Period and the Establishment of the Las Flores Estancia*

Father Juan Crespi, accompanying the Portola Expedition, provides the earliest written account of Las Flores, describing the place as a rose-covered mesa near an Indian campsite that he called *Los Rosales* (Rosenthal and Padon 1994; Schaefer 1992), later known as *Las Flores*. In 1776, the Anza Expedition passed through the area and Fray Pedro Font made comments about Las Flores, but it is not clear whether he was referring to San Onofre or Las Pulgas drainages. The Luiseño at Las Flores were brought under the influence of Mission San Juan Capistrano soon after the mission was established in 1776; baptisms from the Las Flores *ranchería* of *Huisme* are recorded as early as 1779 (Rosenthal and Padon 1994). After the establishment of Mission San Luis Rey in 1798, the Las Flores *rancherías* came under the jurisdiction of San Luis Rey and Fr. Antonio Peyri. As Schaefer (1992:pg. 8-2) notes, Peyri's policies kept the Luiseño at their villages rather than forcing them to the missions. To establish Church presence in these areas, the padres built a series of hierarchical outposts. The lowest level of outpost was the *rancho*, a cattle ranch with a chapel for the Spanish Mayodomo and Indian neophytes. A *rancho* with an upgraded chapel and facilities was sometimes called a *sitio*. The next higher level of outpost was the *Estancia*, a cattle ranch with an upgraded chapel, some liturgical facilities, and the ability for a visiting priest to say Mass on an irregular schedule. The next step was the *Asistencia*, which was a fully developed but small mission that provided regular Mass, marriages, baptisms, and funerals. *Asistencias* differed from missions only in that the former lacked a full-time resident priest (Englehardt 1921:374; Weber 1988:70-71; cited in Schaefer 1992: 8-2). Schaefer (1992:8-2 to 8-3) discusses how the term *Asistencia* became associated with Las Flores but convincingly argues that it functioned as an *Estancia*.

Because of its ample pasturage and permanent water supply, Las Flores became an important grazing area for Mission cattle even before the *Estancia* was built. So important was Las Flores that the padres and the San Diego Presidio soldiers bickered over its use. In his April 8, 1810 letter to Francisco Maria Ruiz, Fr. Peyri desperately argues his point:

> Despite the fact that about a month ago I ordered all the horses of the soldiers of that Presidio from the parage [literally a "place"; in this sense a grazing area for stock] of Batequitos, which has been occupied for some years by the herds of sheep, persuaded that it would be with the order of the governor of the provinces, but in fact you not only occupied the mentioned parage, but also now again we come to the parage of Las Flores, of this mission. We can no longer feel that it is by order of the governor, but that you yourself placed them there, without considering that said parage is the casco [literally shell or helmet, hereinafter translated as shelter] where the cattle are kept, and where most of the year the rodeo [roundups] are held. In the months of November, December, and January, several there died for lack of pasture, and although there is a little pasture now, the cattle are now in the rainy season; most of the cattle are now in the canada [vale] of Santa Margarita, finishing the little pasture there is. They will go on to the next vale, and the only one, of Las Flores, and if it is found grazed by the soldiers' horses, what will the cattle live on? I wouldn't know, nor would you. There is only left to say: more than ever, the cattle of San Luis. Don Francisco, this parage belongs to the mission, and the mission needs it, needs it, needs it. With this supposition, we beg of you to rescind the order you have given while you ask the governor his opinion, and we shall ask the Padro Presidente for his way of thinking on the matter, which, in similar cases and such critical circumstances, I turn to you, as we must conform to their decisions, and not

> to that which we may desire, as such. Alexander Taylor Collection #356, pp. 0213-0214; Huntington Library Facsimiles; translation and comments by William H. Mason; cited in Schaefer 1992).

Las Flores must have continued to grow in importance because by 1823 Mission fathers had constructed a patio-shaped compound at Las Flores complete with granaries and a tiled roof. Further construction followed and by 1827 Las Flores consisted of the Indian village, a house for the mayordomo, granaries, a chapel, belltower, and other liturgical rooms (Brigandi 1982; Rosenthal and Padon 1994). The compound measured 25 meters on a side and featured impressive Mission-style architecture (Figure 2-4) situated on a high terrace with a commanding view of both the ocean to the south and Las Pulgas Canyon to the northeast. Today, the *Estancia* compound is marked by low mounds of adobe and a short wall segment protected by a shelter built by the Boy Scouts (Figures 2-5 and 2-6).

Early accounts provide a glimpse of life at Las Flores and indicate some of the activities that took place in surrounding areas:

> In the same direction, to the north at a distance of three leagues [from San Luis Rey], the Mission has the Rancho of San Pedro, known as Las Flores. The place has a house, granaries, and a chapel, which buildings form a square or large patio. Holy Mass is offered up in the chapel. In the patio, by means of water taken out of a pool near the sea, corn is raised. In the plain, wheat and barley are raised in season. About one league from the ranch are the pastures for the cattle. The locality is called Las Pulgas (Englehardt 1921:51-52).

> After taking leave of our hospitable friend, we mounted our horses and rode on without meeting any place worthy of notice till we came to the "Rancho de las Flores," one of the cattle establishments of San Luis. It is situated on an eminence commanding a view of the sea, with the distant islands of St. Clemente and Catalina, and overlooking an adjacent level, extending for miles around, covered with thousands of animals grazing. A few inferior gardens are scattered about in the little valleys, cultivated by Indians, for their own personal benefit, and in which they are permitted to labor when not required to give their time to the interests of the Mission (Robinson 1844:26-27).

***Indian Pueblo Period***

After the secularization of mission lands, Las Flores became one of the *Pueblo Libres* (Free Cities) in 1835. Resident Native Americans were given the land and cattle under communal control. Las Flores was something less than a success economically, apparently because of interference from Pio Pico, the civil administrator of the mission from 1835-40. Pico was not well liked by the Luiseño and with good reason—he clearly wanted their land. The Native Americans complained that Pico let his cattle graze on their lands, he and his men occupied the *Estancia* despite Native American objections, they diverted water from the Native American's irrigation ditches, and took advantage of young unmarried girls.

VIEW NORTHEAST

*Source:* Schaefer 1992. Foreground modified by SAIC to improve clarity.

**Figure 2-4. 1850 Sketch of Las Flores *Estancia*, by H.M.T. Powell.**

William Hartnell, who had been appointed inspector of the missions in 1839, tried to stop Pico's efforts to appropriate mission and Native American property, but Hartnell was removed from his post, and in 1841 Governor Alvarado granted Pio Pico and his brother Andres approximately 90,000 acres surrounding the pueblo. In 1843, the Luiseño petitioned the governor of California for title to their lands. Although Rosario Aguilar, the Justice of the Peace at San Juan Capistrano, recommended to the governor that they be granted clear title, a formal grant was never made, and in 1844 the Picos succeeded in wresting title to Las Flores away from the Luiseño, effectively ending any chance they had to independently develop mechanisms to adapt to a changing world. Records indicate that Pico allowed the Native Americans to continue to live in the houses and to sow their fields, presumably so he could still use them as laborers. The 1852 California State Census recorded 90 Indians still in residence, but most moved to Temecula or Pala by the late 1850s, although some may have worked as ranch hands or domestics as late as 1873 (Hayes 1976:118; Stephenson 1936:8; cited in Schaefer 1992: Section 8, pg. 16).

### *The American Period and Construction of the Las Flores Adobe*

When the Picos acquired Las Flores, which they renamed the Santa Margarita y Las Flores, they had their headquarters in the old mission adobe at Santa Margarita (currently the Base Commander's residence). Legal battles during the Americanization of California over property rights and a severe drought in 1863-64 caused Pio Pico, now full owner of the *rancho*, to fall into serious debt. He turned to his brother-in-law, John Forster, for help. Forster agreed to assume Pico's debts in return for control of the *rancho* and in 1867 began construction on a two-story adobe home near the old *Estancia* using some of the materials salvaged from the building. In 1868, John and his wife Ysidora moved into the house, now known as the Las Flores Adobe Ranch House (Figure 2-7).

The ranch was sold on Forster's death in 1882 to cover debts, and the surviving Forsters moved to San Juan Capistrano, where some of their descendants still live today. The ranch was bought by Richard O'Neill, who then sold it for a handsome profit to James Flood. In 1906, Flood's son James Jr. deeded a half-interest in the ranch back to O'Neill, who on his death in 1910 left it to his son Jerome. During this time the ranch had been leased to the Magee family, who farmed lima beans there. In 1942, the U.S. Navy purchased the 123,000-acre Rancho Santa Margarita for a Marine training base. The Magees were allowed to continue farming at Las Flores. Louis Magee continued raising lima beans, using four big caterpillar tractors that "pull the plows that turn under the soil as deep as 18 inches and pull the planters that cover 24 feet or 16 rows at a time" until his retirement in 1962. Members of the Magee family continued to live in the adobe ranch house until 1967 when poor health forced Louis's widow, Ruth, to leave. Plans were made to demolish the adobe, but the Friends of the Las Flores Adobe, organized by Betty Keller, a descendant of the Magee family, succeeded in having the building placed on the National Register of Historic Places on November 24, 1968.

In 1973, the Orange Empire Area Council of the Boy Scouts of America leased 51 acres at Las Flores including the adobe and the *Estancia*. For a while the eastern wing of the adobe was used as a museum but due to the condition of the building, safety concerns, and constraints on remodeling a landmark, it is no longer used.

Figure 2-5. Standing Adobe Wall Segment of the Las Flores *Estancia*

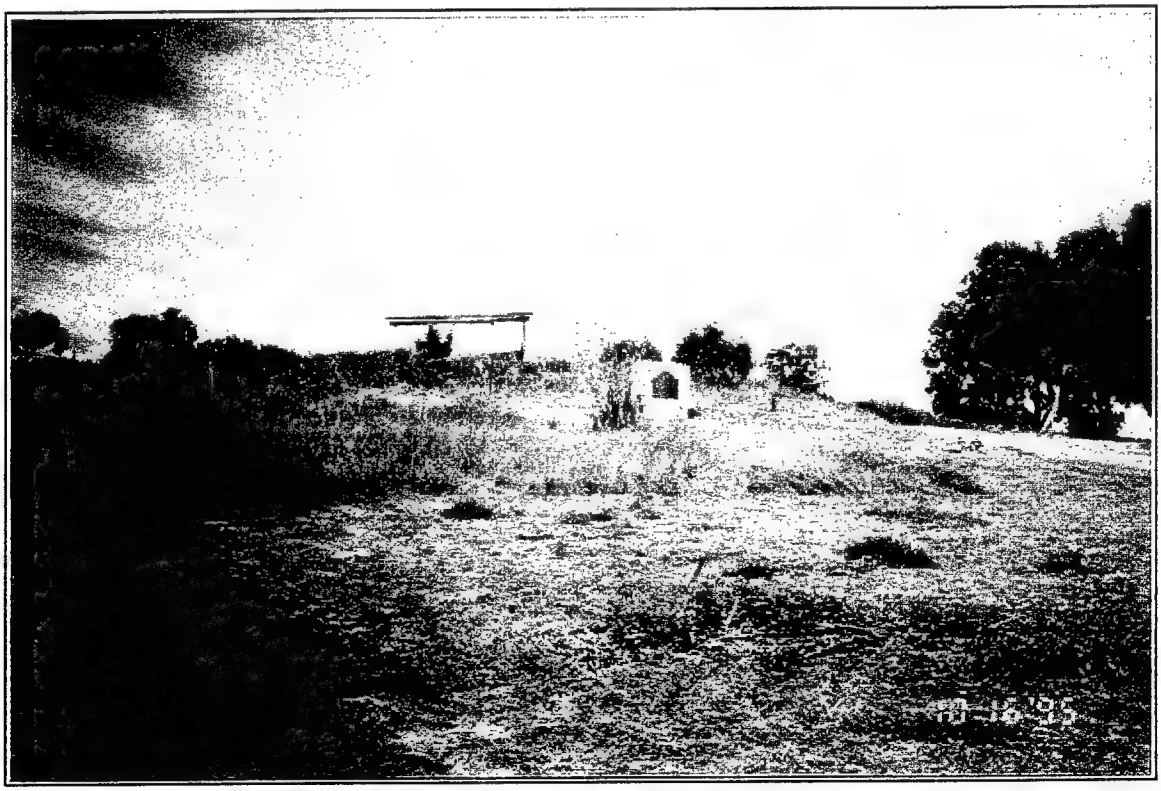


Figure 2-6. Southwest View of the Las Flores *Estancia* site

Figure 2-7. Photograph of the Las Flores Adobe Ranch House (showing excavations in Unit 110)

# Part II

# NRHP Evaluation of Archaeological Deposits at the Las Flores Site, CA-SDI-812/H

# 3 RESEARCH DESIGN

## 3.1 PREHISTORIC ORIENTATION

The research design for archaeological testing at SDI-812/H was established in a previous document (Rosenthal and Padon 1994) and is excerpted below:

> The purpose of the . . . testing program is to provide sufficient information to: first, establish the extent and integrity of the archaeological remains at CA-SDI-812H; second, ascertain if significant archaeological resources apart from historic structural remains are present; and third, determine if impacts to significant resources will occur should the project be implemented. Our project goals are to evaluate the archaeological resources and make recommendations concerning their scientific importance and their physical condition.
>
> The field and laboratory activities are structured to obtain what Redman (1987: 258) has identified as "baseline" information: the minimal set of information that permits general inferences about traditional archaeological questions of chronology, subsistence, trade connections, and site type. If baseline information is obtained then, during the analytical stage, problem orientations or the scientific questions which can be answered will emerge. The baseline information issues are briefly discussed below.
>
> *Chronology*
>
> The time and range of an archaeological site occupation is always a research concern. At CA-SDI-812H determining the resources' chronological affiliation is particularly important. The remains may be very old, prehistorically; fairly recent, prehistorically; or historic and contemporaneous with either the estancia or rancho adobe. The sorting and dating of artifacts and their stratigraphic context will be crucial in site evaluation as other research questions require knowing when occupation occurred.
>
> As our brief culture history demonstrates, there is a paucity of dated sites in the Early Man and La Jollan-Milling Stone periods between the major lagoon-estuary systems of Agua Hedionda and Newport Beach. Particularly, we lack data about early adaptations to exposed coastal settings. Any Camp Pendleton site dating to this time would provide new and potentially significant data about human adaptation.

A second chronological issue relates to occupational continuity. Ethnohistoric information and historic records indicate a Juaneño/Luiseño village existed at Las Flores. Was this village present prehistorically? If so, for how long did it exist?

A final chronological issue is less clear-cut than the above date and range questions. At Spanish contact Takic peoples occupied an area between the Chumash (Hokan) to the north and the Ipai or Northern Dieguiño (Yuman) to the south. Researchers have argued about when the initial Shoshonean occupation of coastal southern California occurred. Was it fairly recent, about 1,000 years ago? Or were Takic people present for several millennia (Koerper 1981)? Site data could contribute to understanding the initial Takic colonization of coastal southern California.

To establish the occupational date for the archaeological resources, artifacts, and ecofact samples which permit both absolute and relative assays must be obtained. Absolute dates can be acquired from radiocarbon samples, preferably charcoal, but also bone and shell. Relative dates can be inferred from obsidian hydration, palynomorphs, and seriated artifacts such as projectile points, shell and stone beads, and ceramics. Each sample needs to be collected in clear stratigraphic and cultural contexts.

*Subsistence*

Southern California prehistory is the story of successful hunting and gathering subsistence practices. Recently, coastal and Channel Island research has suggested that this broad subsistence pattern conceals major adaptive differences. Glassow and Wilcoxon (1988) have argued that exposed and protected coastlines had distinct strategic uses affecting demography and sedentism. Raab and Yatsko (1990) have suggested great time depth for a maritime fishing economy.

What was the subsistence base at Las Flores? Was there seasonal or full-time use of coastal resources? Were ocean resources used at all? What specific fish, shellfish, and land fauna were procured? What was the accompanying plant collecting regime?

To address subsistence issues, well-preserved vertebrate and invertebrate fauna must be collected and analyzed. Although high oxidation rates inhibit paleobotanical preservation along the southern California coast, column and sediment analysis can occasionally recover carbonized seeds, stems, and other plant parts. Therefore, although standard 1/8 screening techniques can recover representative samples of most fauna, column sampling will be needed to recover floral remains.

These faunal and floral data must be analyzed from a micro environmental and macro environmental perspective. We must ask, "What can the data tell us about both regional and local environments and their potential exploitation?"

*Trade and Exchange*

The historic record indicates that a major spring existed at Las Flores and because of its presence the locale became both a settlement and a stage stop, a focus of both permanent and transient use. A weary traveler exchanges what he has to gain access to the desired fresh water and fill a canteen or a horse's belly. The artifacts of exchange, found at major water sources, often tell us as much about regional as well as local activity. Were artifacts coming from inland desert areas, along known trails from the Southwest? Was this coast part of the Channel Island interaction sphere where status objects were produced and exchanged in the Late Prehistoric Period (Arnold 1992)? Are materials from non-local sources arriving as finished products or being worked nearby and redistributed?

To define the regional relationships all artifacts must be carefully analyzed. Stone artifact sourcing is particularly critical to understanding what commodities represent local or distant origins. Careful analysis of manufacturing, repair, and recycling materials can suggest resource scarcity and value.

*Settlement Patterns*

Hunter-gatherers must rely on their environment's seasonally occurring products for sustenance. They often need to establish settlements where foods occur, or alternatively collect and move food to a more permanent camp where it can be processed and stored. Lewis Binford (1979, 1980) has described the resource strategies as foraging (moving to food sources) versus collecting (moving food to a camp) and argued that the extremes and variations of these strategies produce distinct settlement patterns.

When the Spanish arrived in southern California, most coastal residents appeared to have settlements of some permanency reflecting collecting practices that moved plant foods to camps near major water sources. Coastal and near-shore fish and shellfish resources enhanced this sedentism.

The time depth and specifics of this settlement pattern are not well understood. By the Late Millingstone Horizon (ca. A.D. 500), some researchers have argued, year-round coastal occupation was present (Drover et al. 1983). This trend toward primary residences surrounded by seasonal camps became more and more pronounced in the Intermediate Horizon (ca. 3,000 B.C.-A.D. 500), when acorn processing/storage techniques increased dietary stability. However, the land's products are finite and can be over-exploited, creating population limits and competition for resources. These strictures define group size, territory, and the settlement pattern. The Luiseño had clearly defined village territories where families and kin groups owned and defended key resources.

What settlement type, permanent or temporary, is found at Las Flores? Was the area seasonally used? If multiple components exist, is there increased sedentism in the more recent settlement?

To answer questions about site permanency, faunal and floral data that reflects seasonality can be used. Alternatively, it can be argued that extensive remains, diverse tools, and long-distance trade items are in themselves indications of site stability over time. Storage pits and structural remains, processing and maintenance as well as extraction tools all suggest a settlement that was occupied by collectors rather than foragers. A final data set that can suggest settlement pattern is faunal emphasis. Fish are collector's resources requiring technological investments (boats, nets, lines, sinkers, weirs) that are not practical for mobile people. Other resources such as grass seeds, acorns, and pine nuts require at least some seasonal movement. If the archaeological remains indicate an emphasis on plant processing or alternatively on fishing, then more or less settlement permanency can be suggested.

## 3.2 HISTORIC ORIENTATION

Data supplied from archival research, along with the results obtained by Schaefer during his 1992 evaluations program, suggest a number of research questions pertinent for Locus A (the *Estancia* ruins and associated archaeological midden soils) and Locus B (Las Flores Adobe Ranch House). The lack of specific archival information that can be related to Locus C, D, or E requires a more generalized approach to these areas.

Archival descriptions for the *Estancia* describe a complex that contained a cattle ranch with an upgraded chapel and some liturgical facilities. Other features would have included granaries, a well, and storage facilities (Schaefer 1992: Section 8, Pg 2; 17). Prior to the establishment of the *Estancia*, mention was made of a *casco* or shelter where cattle were kept. Mention is also made of gardens that were scattered throughout the valley, cultivated by Indians (Robinson 1844:26-27).

Specific questions relating to time (chronology), settlement patterns, site abandonment, and potentially, ethnicity and/or acculturation can be addressed for the site as a whole.

### Chronology

Three historic periods are recorded for SDI-812/H, including the Spanish, Mexican, and American periods. These overlapped and altered traditional Luiseño settlement patterns. The extent of this alteration was not uni-directional, with changes occurring for each contact group. Each period brought with it differences in technology, changes in subsistence patterns, and availability of tool types. The extent these differences are reflected in the artifact assemblage must be documented through careful analysis of all recovered historic artifacts, along with documentation of changes in the prehistoric assemblage (e.g., continuation of traditional patterns, use of non-native materials for traditional artifacts). Time differences from the Spanish contact to Mexican rule to American settlement reflects less than 100 years. Are there changes in the artifact assemblage that are reflective of this short time period? How does the assemblage differ between the Spanish to Mexican to American periods? What would be considered "type" artifacts?

Two lines of inquiry regarding component differentiation can be addressed. The first would compare horizontal artifact and feature distribution patterns to previously investigated Luiseño, Mission, and contact period sites in the San Luis Rey drainage. The focus of this analysis will be to determine if prehistoric and historic period activity areas can be defined and, if so, to see whether

they overlap or are mutually exclusive. The second line of inquiry focuses on the vertical distribution of Euroamerican and lithic artifacts; is there a demonstrable stratigraphic separation between historic and traditional artifact assemblages?

**Settlement Pattern/Community Function**

The changing role SDI-812/H played through time may have influenced the degree to which various resources and technologies were used. Although never completely specialized, various emphases were present in the kinds of activities in which site occupants engaged. These activities ranged from Luiseño prehistoric village settlement patterns (hunting/gathering) to a contact period that included farming and cattle ranching. Can changes to the physical landscape, use of specific resources, and/or changes in the settlement pattern be correlated to the historic time periods? How did the subsistence base at Las Flores shift through time? How did the introduction of Euroamerican agricultural practices such as cattle grazing alter the traditional residential patterns as reflected at SDI-812/H? If a change occurred, can it be documented through changes in artifacts types, particularly the increase of Euroamerican tools along with the modification of traditional technology? Research goals would focus on determining both horizontal and vertical differences in the artifact patterns for the prehistoric and historic assemblages. Research in the faunal and floral assemblage may help define any differences in either the horizontal or vertical distribution pattern. For example, faunal analysis of butchering marks on bones could determine if the marks were made by a metal or stone tool. The distribution of items with different types of butchering may assist in identifying discrete occupational areas at the various loci.

**Site Abandonment**

Questions concerning community disintegration and site abandonment can be addressed through the examination of final phase artifacts and site formation processes. Information regarding the site as a whole (Las Flores) suggest that the Pueblo managed to persist into the American period (until 1854-55), despite having been sold a decade before to the Picos. If present, the final process of abandonment and reuse of the *Estancia* compound (Locus A) would be represented by the last secondary trash and modifications that took place when this particular area became a stopping place on the Los Angeles-San Diego stage coach line. The exact processes related to use and reuse of Locus C, D, and E is unclear at this time; testing in these areas could help define specific activities that were carried out.

**Ethnicity/Acculturation Process**

The direction and extent of acculturation and adaptation may be reflective in the changes in technology, subsistence patterns, and use of the landscape. The coexistence of Native American and Euroamerican cultural materials offers a unique set of research questions. The way in which each particular site occupant or group made use of the site, as a whole, is suggested to be representative of the adaptation processes. Potential testable hypothesis would include: (1) acculturation process was dominated by a trend toward adoption of non-indigenous technology by the Native American population. The principal restriction on adaptation would have been the availability of Spanish, Mexican and/or American goods, which was dependent on the economic development of the *Estancia* and *rancho;* (2) the process of acculturation was not characterized by a uni-directional tendency to adopt or retain non-indigenous materials and technology. Test implications for Hypothesis 1 would include a significant correlation between the availability and quantity of non-indigenous goods present at the site; the use of indigenous goods mainly for those

items which were excessively fragile, bulky, or otherwise difficult to transport easily; and maximum reuse of non-indigenous materials. Hypothesis 2 would be supported by a low correlation between the availability and quantity of non-indigenous goods used; a low correlation between ease of transportation and the quantity of specific kinds of non-indigenous artifacts; and a failure to maximize reuse of non-indigenous materials except in cases of obvious utilitarian superiority.

Mission records suggest that a number of *ranchos* and missions encouraged the production of Native American brownware pottery and continued use of stone tools. Analysis of historic artifacts would address the issue of replacement. How were imported materials integrated into an existing prehistoric typology (e.g. glass for shell beads; projectile points made from wine bottles; use of white wares and ceramics over traditional brownwares)?

Horizontal and vertical distributions of both Indian and Euroamerican cultural remains should be examined to determine whether items such as tile, nails, glass, ceramics, and other nineteenth century manufactured artifacts were used by Native Americans. Technical studies of the pottery and comparisons with other assemblages ascribed to Mission and post-Mission manufacture should aid in refining dates, cultural affinity, and technology reflected in the collection.

## 3.3 NATIVE AMERICAN HERITAGE VALUES

Because the Las Flores vicinity is thought to be the traditional territory of the Luiseño *Howak* lineage and Juaneño people also claim this area, every attempt will be made to identify any feature or artifact that may reflect traditional values for both groups. Native American consultation will be conducted by Marine Corps Base, Camp Pendleton. Native American participation will be invited to evaluate the site's potential heritage values.

# 4 METHODS

## 4.1 FIELD METHODS

Extensive excavations were conducted at SDI-812/H to define site boundaries, conduct geomorphological studies, and evaluate the site's potential for National Register of Historic Places (NRHP) eligibility. Fieldwork took place between October 11 and November 1, 1995 and was directed by Chantal Cagle and Leeann Haslouer of SAIC. Details are presented below.

### Surface Scrapes

Approximately 500 shovel scrapes measuring 50 cm x 1 m were conducted by hand around the periphery of the original mapped boundaries of SDI-812/H. In addition, approximately 25 scrapes were conducted by the backhoe. The purpose of the scrapes was to clear areas of dense brush where there was poor ground surface visibility in order to determine whether surface deposits of cultural material were present in these areas.

### Backhoe Augers and Trenches

Thirty-two auger holes were mechanically excavated around the perimeter of the site to look for subsurface deposits and to determine the site boundaries. The augers measured 40 cm in diameter and were excavated to a depth of 2.2 m. Excavation in discrete levels was not possible due to the limitations of the screw-auger. A representative sample of the spoils were screened through 1/8-inch mesh and the presence of cultural material was recorded. No cultural material was collected due to the lack of precise provenience information.

Seventeen backhoe trenches were excavated for the geomorphological study. The trenches were excavated in 20 cm levels and were generally 1 m wide, 5 m long, and 2.2 m deep, with the exception of three trenches that were excavated to 4.3 m as directed by the geomorphologist. Backhoe excavation was halted in the event that a cultural deposit was encountered.

Upon completion of the geomorphological study, all augers and trenches were backfilled.

### Excavation Units

Thirty-eight 1 m x 1 m test units at SDI-812/H were completely excavated (Table 4-1). Two additional units were started but were discontinued due to severe disturbance (see below). The units were placed throughout each of the five loci and along the project APE. Twelve units were placed in Locus A, three in Locus B, 16 in Locus C, four in Locus D, and five in Locus E (Figure 4-1). Units 10, 17, 18, 32, 38, and 23 are adjacent to the proposed APE. Seven of the 38 units were

**Table 4-1. Test Excavation Unit Dimensions and Volumes**

| *Unit No.* | *Locus* | *Size (m)* | *Volume Excavated ($m^3$)* | *Depth of Unit (cm)* |
|---|---|---|---|---|
| 1 | A | 1x1 | 0.5 | 0-50 (stp: 50-90) |
| 2 | A | 1x1 | 0.6 | 0-60 |
| 3 | A | 1x1 | 0.7 | 0-70 |
| 4 | A | 1x1 | 0.7 | 0-60 |
| 5 | A | 1x1 | 0.4 | 0-40 |
| 6 | A | 1x1 | 0.5 | 0-50 |
| 7 | A | 1x1 | 0.45 | 0-45 |
| 7a | A | 1x1 | 0.45 | 0-45 |
| 8 | A | 1x1 | 0.5 | 0-50 |
| 9 | A | 1x1 | 0.6 | 0-60 (stp: 60-80) |
| 9a | A | 1x1 | 0.6 | 0-60 |
| 10 | C | 1x1 | 0.6 | 0-60 |
| 11 | C | 1x1 | 0.3 | 0-30 |
| 12 | C | 1x1 | 0.4 | 0-40 |
| 13 | C | 1x1 | 0.5 | 0-50 (stp: 50-60) |
| 14 | C | 1x1 | 0.5 | 50-100 |
| 15 | C | 1x1 | 0.4 | 0-40 |
| 16 | C | 1x1 | 0.4 | 0-40 (stp: 40-50) |
| 17 | C | 1x1 | 0.7 | 0-70 |
| 18 | C | 1x1 | 0.2 | 0-20 |
| 19 | C | 1x1 | 0.6 | 120-190 |
| 19a | C | 1x1 | 0.5 | 140-180 |
| 19b | C | 1x1 | 0.5 | 130-180 |
| 20 | E | 1x1 | - | *discontinued* |
| 21 | E | 1x1 | - | *discontinued* |
| 22 | E | 1x1 | 0.4 | 62-102 |
| 23 | E | 1x1 | 0.7 | 50-120 |
| 24 | E | 1x1 | 0.3 | 70-100 |
| 26 | C | 1x1 | 0.6 | 0-60 |
| 27 | C | 1x1 | 0.5 | 0-50 |
| 28 | C | 1x1 | 0.6 | 0-60 |
| 29 | A | 1x1 | 0.5 | 0-50 |
| 30 | B | 1x1 | 0.4 | 0-40 |
| 31 | B | 1x1 | 0.6 | 0-60 (stp: 60-70) |
| 32 | C | 1x1 | 0.5 | 0-50 |
| 33a | B | 1x1 | 0.5 | 0-50 (stp: 50-100) |
| 35 | D | 1x1 | 1.0 | 0-100 |
| 36 | D | 1x1 | 1.0 | 0-100 (stp: 100-120) |
| 37 | D | 1x1 | 1.1 | 0-110 |
| 38 | D | 1x1 | 0.6 | 0-60 |

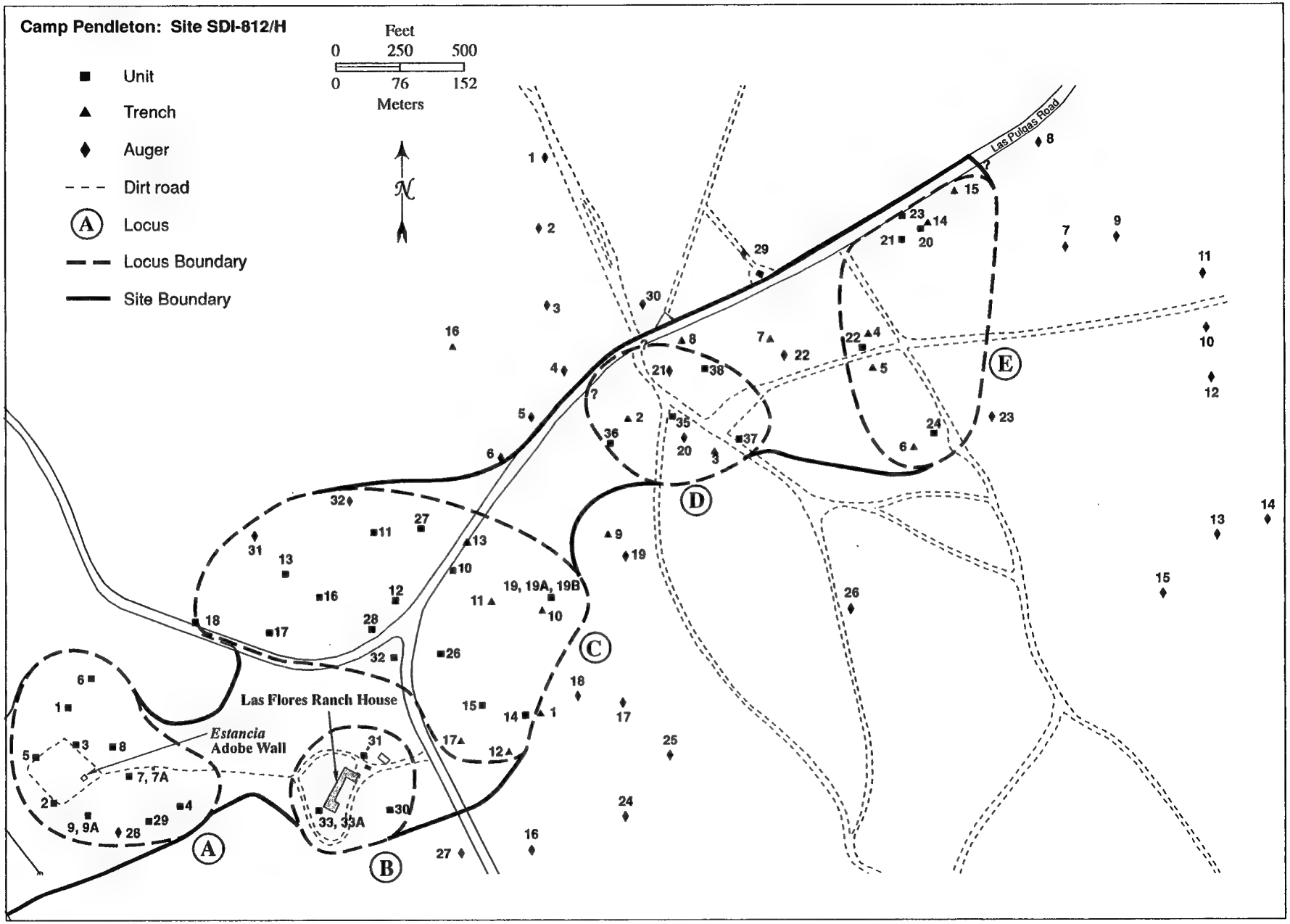



**Figure 4-1. Location of SAIC's 1995 Excavations at SDI-812/H**

configured to cover an expanded area. Units 7 and 7a were placed adjacent to each other, forming a 1 m x 2 m excavation area. Units 9 and 9b were also formed into 1 m x 2 m area by being placed adjacent to each other. Units 19, 19a, and 19b were configured into an L-shaped block covering a 3 $m^2$ area.

Two units (20 and 21) were found to have been placed in an area with a substantial amount of redeposited material, based on the geomorphologists' inspection of Trenches 14 and 15. Trench 14 was excavated to a depth of 182 cm and old style, cloth-covered communication wire was discovered at 40 cm below surface. Both Units 20 and 21 exhibited stratigraphy similar to Trenches 14 and 15 (i.e., redeposited gravelly soil mixed with a sparse amount of *Donax* sp. shells to approximately 50 cm and a sterile silty sand below that). The material recovered from Units 20 and 21 was not retained or processed.

In some cases, a large pit was first mechanically excavated by a backhoe before hand excavations began in order to remove sterile, fill, or disturbed overburden soil. Seven units (Units 14, 19, 19a, 19b, 22, 23, and 24) were placed in large (approximately 5 x 5 m) pits that had been excavated by the backhoe to depths between 50 and 120 cm. These depths, which correspond to within 10 cm of the underlying cultural deposit, were based on information derived from inspection of backhoe trenches adjacent to the pit areas.

All units were excavated in arbitrary 10 cm levels and the recovered material was water screened through 1/8-inch mesh screen. A total of 23.1 $m^3$ was hand excavated. The units were excavated until a clear sterile level was reached.

Shovel test pits (STPs) with a diameter of 50 cm were placed in the floor of the final level of 7 units (Units 1, 9, 13, 16, 31, 33a, and 36) to confirm that a sterile level was reached. Column samples, measuring 25 x 25 cm, were removed from Locus A (Units 8 and 9a), Locus C (Unit 13), and Locus E (Unit 24); deposits in these loci and units exhibited the highest degree of integrity. Column samples were waterscreened through 1/16-inch mesh screen.

A profile of the north wall of each unit was drawn and all units were photographed with black-and-white print film and color slide film. All units were backfilled after profiles were completed.

**Geomorphological Investigation**

The geology and geomorphology of SDI-812/H was examined in order to establish the geoarchaeological context of the cultural deposits and associated artifacts. Landforms associated with the site were classified by type through field observation and the use of topographic maps. Geologic deposits and the soils developed within them were exposed in cross-section within STPs, test units, auger holes, and backhoe trenches. The deposits and soil profiles exposed were examined and described following guidelines and nomenclature established by the U.S. Department of Agriculture Soils Survey staff (USDA 1992). In addition, the location and extent of soil profile disturbance indicators were noted.

Geologic deposits displaying no sign of soil development were described based on the characteristics of the sediments comprising the deposits. Deposits displaying soil profile development were described in detail with regard to the characteristics of the parent material (sediments comprising deposits that the soil profile is developed in) and established guidelines for

soil profile descriptions. Characteristics of geologic deposits generally reflect the depositional environment of the sediments that compose them. Soil profile descriptions document: profile thickness (where possible), degree of horizonation, color (dry and moist; Munsell color notation), field estimation of texture (<2mm grain size fraction - USDA ternary texture chart, >2mm fraction - percent pebble and cobble gravel present), soil structure, consistence (wet and dry), thickness, abundance and location of clay films, horizon boundaries, roots if present, and secondary carbonate. Based on soil profile characteristics, the degree of soil development is used to estimate the relative age for a given soil. Age estimations reflect duration of surface exposure after cessation in deposition of parent material and, therefore, represent duration of a stable potentially occupiable surface. Soil disturbance indicators and the location of artificially placed deposits were documented to address site disturbance processes and the extent of these disturbances.

### Mapping

Locational data for backhoe trenches and augers was recorded through use of a Magellan Geographic Positioning System (GPS) that uses satellite data to record Universal Transverse Mercator (UTM) coordinates. An electronic total station was used to map the excavation units in relation to modern buildings and roads. Data from the GPS and electronic total station were used to generate maps using the Geographic Information System (GIS) Autocad.

## 4.2 LABORATORY METHODS

Materials recovered during Phase 2 excavations at SDI-812/H were transported to the SAIC archaeological laboratory, sorted into size categories of >1/2-inch, >1/4-inch, >1/8-inch (and >1/16-inch in the case of column samples), and processed.

Material were processed as follows: 100 percent of the materials greater than 1/2-inch and 25 percent by weight of the materials from the 1/4-inch and 1/8-inch categories were sorted into general categories (flaked stone tools, debitage, groundstone, fire-affected rock, pottery, shell, worked shell, bone, worked bone, charcoal, seeds, tile/brick, historic ceramics, glass, metal) and non-cultural material (unmodified rocks and gravels, plant roots, etc.). Counts and weights were recorded and non-cultural material discarded. Counts and weights have been entered into a database and material densities calculated for each major material class. The remaining 75 percent of the 1/4-inch and 1/8-inch materials were sorted as above with the exception that shell, tile, concrete, charcoal, slag, and FAR were not separated out.

# 5 REPORT OF FINDINGS

## 5.1 SUMMARY OF SITE LOCI

The testing program conducted at SDI-812/H included surface survey, scrapes, stratigraphic trenching, augering, unit excavations, laboratory cataloging, and analysis. Results from this program demonstrate that SDI-812/H contains five concentrations of cultural materials, designated as Loci A-E (Figure 4-1, Table 5-1). Both prehistoric and historic archaeological materials were recovered during the subsurface phase of testing; no cultural material was recovered from the surface. A complete listing of the recovered cultural material is provided in Appendix A.

**Table 5-1. Summary of Site Loci**

| | *Locus A* | *Locus B* | *Locus C* | *Locus D* | *Locus E* |
|---|---|---|---|---|---|
| Area | 39,016 m² | 18,241 m² | 86,140 m² | 28,502 m² | 49,404 m² |
| Depth | 40-60 cm | 30-100 cm | 20-180 cm | 60-100 cm | 100-110 cm |
| Landform | Fluvial terrace | Fluvial terrace and floodplain | Southeast portion - floodplain; north and northwest-fluvial terrace | Alluvial fan | Floodplain |
| Elevation (feet amsl) | 60-85 | 65-70 | 65-80 | 80-95 | 75-85 |
| Excavation Units | 12 | 3 | 16 | 4 | 3 |
| Trenches | - | - | 6 | 2 | 5 |
| Augers | 1 | - | - | 2 | - |
| Column Samples | 2 | - | 1 | - | 1 |
| Prehistoric Artifacts (ct/m³) | 376.9 | 555.3 | 327.2 | 66.5 | 26.4 |
| Historic Artifacts (ct/m³) | 745.4 | 2,185.3 | 95.1 | 95.1 | 23.6 |
| Faunal Remains (g/m³) | 7,837.7 | 5,497.1 | 4,216.7 | 8,445.3 | 1,210.9 |

Radiocarbon analysis indicate that the site deposits at SDI-812/H can be assigned to two time periods, a late prehistoric/ethnohistoric Luiseño component and a historic occupation associated with *rancho* operations and the Las Flores *Estancia* (Table 5-2). The buried late prehistoric/ethnohistoric component was located at approximately 140-180 cm beneath the surface along the eastern boundary of Locus C. In contrast, the historic deposits are concentrated within a

meter of the ground surface, particularly in and around the *Estancia* ruins in Locus A and the standing Las Flores Adobe Ranch House in Locus B.

**Table 5-2. Radiocarbon Dates from SDI-812/H**

| *Beta No.* | *Locus/Unit/Depth (cm)* | *Sample Type* [1,3] | *Conventional $^{14}C$ Age (B.P.)* [2] | *Calibrated 1 Sigma Range* | *Calibrated 2 Sigma Range* |
|---|---|---|---|---|---|
| 86597 | A/STP43/20-40 | *Donax* | 580 ± 60 | N/A | A.D. 1850-1950 |
| 86598 | A/STP44/20-40 | *Donax* | 680 ± 50 | A.D. 1830-1950 | A.D. 1710-1950 |
| 89382 | C/13/20-30 | *Donax* | 630 ± 60 | A.D. 1875-1950 | A.D. 1740-1950 |
| 89379 | C/13/50-60 | *Donax* | 720 ± 60 | A.D. 1715-1950 | A.D. 1675-1950 |
| 89378 | C/14/70-80 | *Donax* | 750 ± 60 | A.D. 1695-1950 | A.D. 1660-1950 |
| 89374 | C/14/90-100 | *Donax* | 640 ± 50 | A.D. 1875-1950 | A.D. 1800-1950 |
| 89384 | C/15/30-40 | *Donax* | 730 ± 60 | A.D. 1705-1950 | A.D. 1670-1950 |
| 89381 | C/17/60-70 | *Donax* | 630 ± 60 | A.D. 1875-1950 | A.D. 1740-1950 |
| 89385 | C/19/140-150 | *Donax* | 830 ± 60 | A.D. 1655-1800 | A.D. 1550-1890, A.D. 1935-1950 |
| 89380 | C/19/170-180 | *Donax* | 870 ± 60 | A.D. 1620-1705 | A.D. 1515-1835 |
| 89383 | C/19/190-200 | *Donax* | 910 ± 70 | A.D. 1530-1690 | A.D. 1475-1815 |
| 89376 | D/38/20-30 | *Donax* | 800 ± 60 | A.D. 1670-1835 | A.D. 1620-1950 |
| 89377 | D/38/40-50 | *Donax* | 820 ± 60 | A.D. 1660-1820 | A.D. 1580-1950 |
| 89375 | E/24/90-100 | *Donax* | 660 ± 60 | A.D. 1835-1950 | A.D. 1705-1950 |

*Notes:*
1. All shell samples consisted of multiple valves of *Donax gouldii*.
2. Conventional radiocarbon age based on an estimated figure of +410 years for $^{13}C/^{12}C$ correction; published local reservoir effect for southwest United States coast of -230 ± 25, rounded to the nearest 10 years (see Appendix C).
3. All samples dated by standard counting methods.

The five loci at SDI-812/H are briefly summarized below.

**Locus A** is located outside the APE on a high marine terrace overlooking the valley floor 18-26 m (60-85 feet amsl). The locus is an oval-shaped area measuring approximately 39,016 m² and contains the ruins of the Las Flores *Estancia*. The ruins consist primarily of a mound of adobe melt, approximately 25 meters in length, covered with sagebrush and other vegetation. In addition, there is a short standing adobe wall segment partially protected by a roofed shelter (see Figures 2-5 and 2-6).

Twelve standard test units (6.5 m²) were excavated around the *Estancia* ruins. Because Locus A was not affected by the MCON P-529 project, units were not excavated within the interior of the ruin. Varying amounts of cultural material were recovered from each unit, including animal bone (dominated by cattle remains), marine shell, historic ceramics, tile, glass, metal, construction material, Tizon Brownware ceramics, groundstone, and flaked debitage. The density and diversity of these materials suggest some level of residential activity.

The horizontal distribution of cultural material from SAIC's 1995 unit testing at SDI-812/H is provided in Tables 5-3 and 5-4. Locus A yielded the highest density of Tizon Brownware, Spanish tile/brick, and animal bone for the entire site area (Table 5-4). Test units from Locus A also contained the most taxonomically diverse array of mammals, with fragmented mammal and large mammal elements dominating. No evidence of butchery or processing was noted in the assemblage.

**Table 5-3. Distribution of Cultural Material by Locus**

| *Material* | *Locus A* | *Locus B* | *Locus C* | *Locus D* | *Locus E* | *Total* |
|---|---|---|---|---|---|---|
| **Prehistoric Artifacts** | | | | | | |
| Flaked Stone Tools (ct)[1] | 15 | 13 | 19 | 2 | - | 49 |
| Debitage (ct)[1] | 1,129 | 798 | 2,439 | 240 | 34 | 4,640 |
| Groundstone (ct)[1] | 17 | 8 | 7 | - | - | 32 |
| Tizon Brownware (ct)[1] | 1,288 | 14 | 84 | 4 | 3 | 1,393 |
| Worked Shell (ct)[1] | 1 | - | 3 | - | - | 4 |
| FAR (g)[2] | 4,337.6 | 3,488.4 | 2,672.6 | 308.0 | 123.1 | 10,929.7 |
| **Historic Artifacts** | | | | | | |
| Glass (ct)[1] | 188 | 623 | 183 | 27 | 25 | 1,046 |
| Ceramics (ct)[1] | 57 | 23 | - | 2 | - | 82 |
| Metal (ct)[1] | 214 | 2,625 | 558 | 322 | 8 | 3,727 |
| Tile/Brick (ct)[2] | 4,386 | 7 | 1 | 1 | - | 4,395 |
| **Faunal and Floral Remains** | | | | | | |
| Bone (g)[1] | 2,287.8 | 165.4 | 145.4 | 32.2 | 5.4 | 2,636.2 |
| Shell (g)[4] | 48,657.0 | 8,080.2 | 32,745.1 | 31,215.3 | 1,689.8 | 122,387.4 |
| Seeds (ct)[3] | 1 | - | 51 | 3 | 259 | 314 |

1 Counts and weights equal 100% sample of 1/2", 1/4", and 1/8" material.
2 FAR and tile/brick equal 1/2" material only.
3 Seeds equal 100% sample of 1/2" material and a scan of 25% of the 1/8" remains.
4 Shell equals adjusted weight to approximate true shell weight for all screen sizes (100% of 1/2" material and four times a 25% sample of the 1/4" and 1/8" material)
Note: The rest of the tables in this chapter follow the same sampling design, unless otherwise noted.

**Table 5-4. Density of Cultural Material by Locus**

| *Material* | *Locus A* | *Locus B* | *Locus C* | *Locus D* | *Locus E* | *Total* |
|---|---|---|---|---|---|---|
| **Excavated Volume ($m^3$)** | 6.5 | 1.5 | 7.8 | 3.7 | 1.4 | 20.9 |
| **Prehistoric Artifacts** | | | | | | |
| Flaked Stone Tools ($ct/m^3$) | 2.3 | 8.7 | 2.4 | 0.5 | - | 2.3 |
| Debitage ($ct/m^3$) | 173.7 | 532.0 | 312.7 | 64.9 | 24.3 | 222.0 |
| Groundstone ($ct/m^3$) | 2.6 | 5.3 | 0.9 | - | - | 1.5 |
| Tizon Brownware ($ct/m^3$) | 198.2 | 9.3 | 10.8 | 1.1 | 2.1 | 66.7 |
| Worked Shell ($ct/m^3$) | 0.2 | - | 0.4 | - | - | 0.2 |
| FAR ($g/m^3$) | 677.3 | 2,325.6 | 342.6 | 83.2 | 87.9 | 523.0 |
| **Historic Artifacts** | | | | | | |
| Glass ($ct/m^3$) | 28.9 | 415.3 | 23.5 | 7.3 | 17.9 | 50.0 |
| Ceramics ($ct/m^3$) | 8.8 | 15.3 | - | 0.5 | - | 3.9 |
| Metal ($ct/m^3$) | 32.9 | 1,750.0 | 71.5 | 87.0 | 5.7 | 178.3 |
| Tile/Brick ($ct/m^3$) | 674.8 | 4.7 | 0.1 | 0.3 | - | 210.3 |
| **Faunal and Floral Remains** | | | | | | |
| Bone ($g/m^3$) | 352.0 | 110.3 | 18.6 | 8.7 | 3.9 | 126.1 |
| Shell ($g/m^3$) | 7,485.7 | 5,386.8 | 4,198.1 | 8,436.6 | 1,207.0 | 5,855.9 |
| Seeds ($ct/m^3$) | 0.2 | - | 6.5 | 0.8 | 185.0 | 15.0 |

In addition to the faunal and shellfish remains, a single macrobotanical seed was recovered. Two shell samples were submitted for radiocarbon analysis, with resulting calibrated 2-sigma range dates of A.D. 1845-1950 and A.D. 1705-1950 (Table 5-2).

**Locus B** is located within a floodplain down slope from Locus A (approximately 75 meters east of the outside loci boundaries, 310 meters east of the melted adobe) outside the APE. Locus B consists of a moderately dense archaeological deposit measuring 18,241 $m^2$. The Las Flores Adobe Ranch House (ca. 1867-present) is roughly in the center of this locus. Both the Las Flores Adobe and the area immediately surrounding the structure are currently used as a Boy Scout Camp.

Three units (1.5 $m^3$) were excavated outside the structure; none were excavated within the interior. Units in Locus B were excavated to a maximum depth of 60 cm below current ground level, with the majority of material recovered between 0-30 cm. In terms of overall artifact recovery, Locus B yielded the site's highest densities of historic glass, ceramics, metal, debitage, flaked stone tools, groundstone, and fire-affected rock (Table 5-4). Locus B also contained a moderate density of shell and animal bone. Although fewer faunal species were recovered, this area produced the only identifiable skeletal elements bearing cut marks (two cow ribs with metal knife slices). No macrobotanical remains were recovered, and no shell samples were submitted for radiocarbon dating.

**Locus C** is located up valley from Loci A and B, with approximately 500 meters from the adobe wall in Locus A to the center of Locus C. This area will be directly impacted by the APE. Unlike Locus A or B, Locus C has no standing structures. Locus C consists of a moderately dense, irregularly shaped deposit measuring 86,140 $m^2$. The southeast portion of the locus falls within a floodplain while the north and northwest portion lies on an existing fluvial terrace, at elevations ranging between 20-24 m (65-80 feet) amsl.

Six backhoe trenches and sixteen excavation units (7.8 $m^3$) were excavated in this area. Lower concentrations of historic materials were recovered than from Loci A or B (Table 5-4). Except for Units 19, 19a, and 19b, units were excavated to a maximum depth of 60 cm. Two cultural deposits were identified. The upper deposit is located from the ground surface to approximately 60 cm in depth and is similar to the mixed historic/prehistoric deposits encountered near the surface in the other loci. The lower deposit consists of a buried component initially located during backhoe excavation. This lower deposit lies within an intact buried A horizon. Units 19, 19a, and 19b were excavated to recover a sample of this buried component. Potential for buried deposits was also noted in Unit 14. Based on the vertical distribution of recovered materials and radiocarbon dates, it is clear that the buried deposit represented by Units 19, 19a, and 19b is sufficiently different from the rest of the loci to warrant a separate discussion within sections of this report.

Locus C produced the third highest density of bone specimens (Table 5-4), none of which exhibited evidence of butchering or processing. Unlike Locus A and B, rabbits and other small mammals were predominant, which is consistent with a pre-contact subsistence pattern. Shell was recovered from most of the sixteen units, and macrobotanical remains from two. Nine samples of shell were submitted for radiocarbon analysis, with calibrated 2-sigma dates ranging between A.D. 1475-1815 and A.D. 1800-1950 (Table 5-2).

**Locus D** is located up valley from Loci C, approximately 560 meters north/northeast between the center of Locus C and D. Locus D is immediately adjacent to the APE, and is roughly circular in shape, measuring 28,502 $m^2$. This area of the site is located on an alluvial fan, at an elevation

between 26-29 m (80-95 feet) amsl. Several dirt and paved roads intersect the locus boundary, including Las Pulgas Road, which runs along the north/northeastern boundary of the defined area. Stratigraphic trenching in Locus D indicated the potential for deeply buried archaeological deposits, although none were found during unit excavations. Limited amounts of prehistoric and historic material were recovered from four excavated test units (Tables 5-3 and 5-4). Faunal materials were reflective of a pre-contact assemblage, with no domesticates and few large mammals present. Shellfish recovery for Locus D exhibited the highest site density (Table 5-4). In addition, three botanical seeds were recovered. Two radiocarbon dates indicate locus use between a calibrated 2-sigma range of A.D. 1620-1950 and A.D. 1580-1950.

**Locus E** is the farthest extension of the site. The center of Locus E is located approximately 1,060 meters north/northeast from the adobe wall found with Locus A. The overall area is elongated in shape, measuring 49,404 m². Geologically, Locus E is contained within a floodplain at elevations between 23-26 m (75-85 feet) amsl. Several dirt roads intersect the center of the locus, while Las Pulgas Road forms roughly the northern boundary. Only limited densities of cultural material were recovered from the three excavation units (Table 5-4), supporting the hypothesis that this area was not used as a long-term residential base. Unlike the other loci, however, Locus E contained a relatively high number of macrobotanical remains, including over 250 grass seeds. One shell sample was submitted for radiocarbon dating, resulting in a calibrated 2-sigma range of A.D. 1705-1950 (Table 5-2).

## 5.2 SITE GEOMORPHOLOGY

SDI-812/H occupies several geomorphic surfaces within the valley formed by Las Pulgas, Las Flores, and Piedra de Lumbre Creeks. The site is located within the valley bottom as well as a portion of a fluvial terrace. Besides the valley floor, the cultural components can be placed into several general geomorphic settings, including the following.

**Floodplain**: The floodplain predominates along the more central portion of the valley. Typical soil profile of these deposits includes a weak A horizon at the surface which overlies a C horizon of unaltered fluvial sand (Augers 7, 8, 9, 10, 23, and 25). Within the central portion of the floodplain, a buried A horizon was found below the C horizon (Augers 13, 14, and 15). Buried A horizon soils in this area suggest the possible presence of buried paleo-surfaces within the valley fill sequence.

**Active alluvial fan**: An alluvial fan, formed by the Piedra de Lumbre Creek prior to modern channelization, is located at the northeastern portion of the site. Soil profiles within the alluvial fan generally consist of an A horizon underlain by relatively unaltered sediments (C horizon). Soil stratigraphy within the fan deposits display a sequence of soil profiles suggesting depositional pulses separated by periods of relative stability. Based on their degree of soil development and geomorphic setting, these deposits represent the youngest of the landforms at the site.

**Marine or fluvial terrace surface**: The terrace surface includes the extreme southwestern portion of the site (adjacent to the northwestern bend of Las Pulgas Road, near its intersection with El Camino Real) and the area contained within the *Estancia*. Terrace surfaces are slightly elevated above the level of the floodplain in this area. Soil profiles contain A horizon, A/B or Bw horizon, and a Bt horizon. Based on the position and degree of soil development, this geomorphological setting lacks the potential for buried cultural deposits. The northwestern margin of the fluvial terrace is bounded by a higher terrace surface, while the eastern margin lays buried beneath

younger floodplain alluvium. Trenches 1, 10, 11, 12, Augers 17, 18, 19, and Units 14 and 19 (Locus C) contain evidence for a buried A horizon and/or younger overlying fluvial sediments.

In general, Locus A and B and the higher elevations of Locus C are situated on a relatively high fluvial terrace that flanks the valley floor and floodplain. Profiles exposed in Locus A and B demonstrate the presence of a well-developed A horizon containing cultural material extending from the ground surface to depths ranging from 35 to 60 cm below the surface. Beneath this is an A/B or Bw horizon and a Bt horizon (Figures 5-1 and 5-2). The intermediate horizons vary across the site, but the generally high degree of soil development indicate the landform at Loci A and B forms a stable surface that lacks the potential for buried deposits.

The generalized soil stratigraphy at Loci C, D, and E are more complicated because they are situated in an alluvial setting. The upper portion of Locus C (north of Las Pulgas Road) is located on a fluvial terrace. On the terrace surface, there is a cultural A horizon approximately 20-40 cm thick underlain by a sterile C horizon. Moving toward lower elevations to the south of Las Pulgas Road, the eastern margin of the terrace is buried by younger or unaltered fluvial sands that extend to depths between 80 to 160 cm below grade. This C horizon, in turn, overlies a well developed buried Ab horizon found in STP 28, Trenches 1, 10, 11, 12, 13, Augers 17-19, and Units 14, 19, 19a, and 19b. The buried A horizon varied from 15 to 40 cm in thickness and contains cultural materials at all excavation locations except for Trench 1 and Augers 17-19.

Loci D and E, located in the northeastern portion of the site, are situated on an alluvial fan formed by Piedra de Lumbre Creek where it enters Las Flores Valley. Soil profiles within the alluvial fan deposits generally consist of an A horizon cultural deposit underlain by relatively unaltered C horizon sediments. These deposits represent the youngest of the landforms at this site. Backhoe Trenches 14 and 15 (Locus E; maximum depth of 4.3 m) exposed multiple A horizons buried beneath the C horizons (Figures 5-1 and 5-2). Profiles of the units and trenches indicate short-term depositions separated by periods of relative stability. Based on a similar stratigraphy found in Locus C, portions of Loci D and E have the potential to contain deeply buried cultural deposits even though none were documented.

Locus D is bisected by the Piedre de Lumbre stream channel. Stratigraphy is variable due to considerable fluvial and mechanical disturbance. In general, the stratigraphic sequence consists of an A horizon cultural deposit buried beneath recent alluvium. In more disturbed areas, the upper alluvial deposit can be described as a thin (17-20 cm) C horizon. In less disturbed areas, the upper deposit contains a thin (13-17 cm) A horizon with little to no cultural material. Depth of the buried, cultural-bearing A horizon varies according to the position on the alluvial fan. At its highest elevations near Las Pulgas Road, the A horizon is 17-20 cm below the ground surface. From Las Pulgas Road, however, the A horizon slopes to the southeast and is approximately 75 cm below ground surface in Trench 3. The cultural deposit is visible in a natural stream cut adjacent to an active stream channel approximately 90 m south of the intersection of Las Pulgas Road and Piedra de Lumbre Creek. At this location, the deposit is 41 cm thick and contains a high density of shell and organic materials. The A horizon can be traced for some 10 m along the stream bank to Trenches 2 and 3, Auger 20, and Units 35-38. Portions of the A horizon, however, appear to be disturbed based on their mottled appearance and the presence of locally intermixed sand and gravel (noted in Trench 2 and Auger 20). Mottling in Unit 36 and heavy gravels in Unit 37 also attest to impacts from mechanical and fluvial processes.

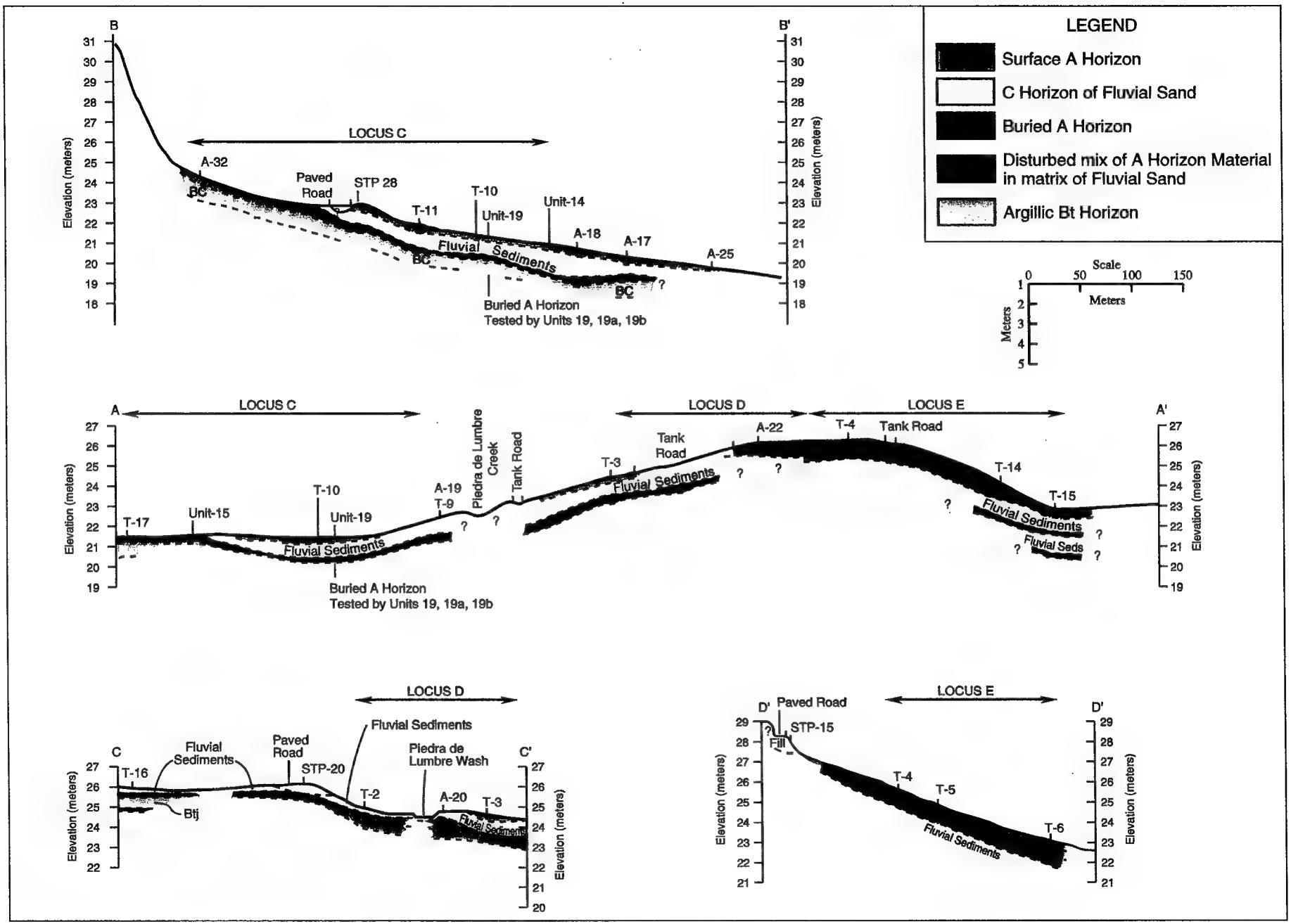



**Figure 5-1. Generalized Stratigraphy of SDI-812/H**

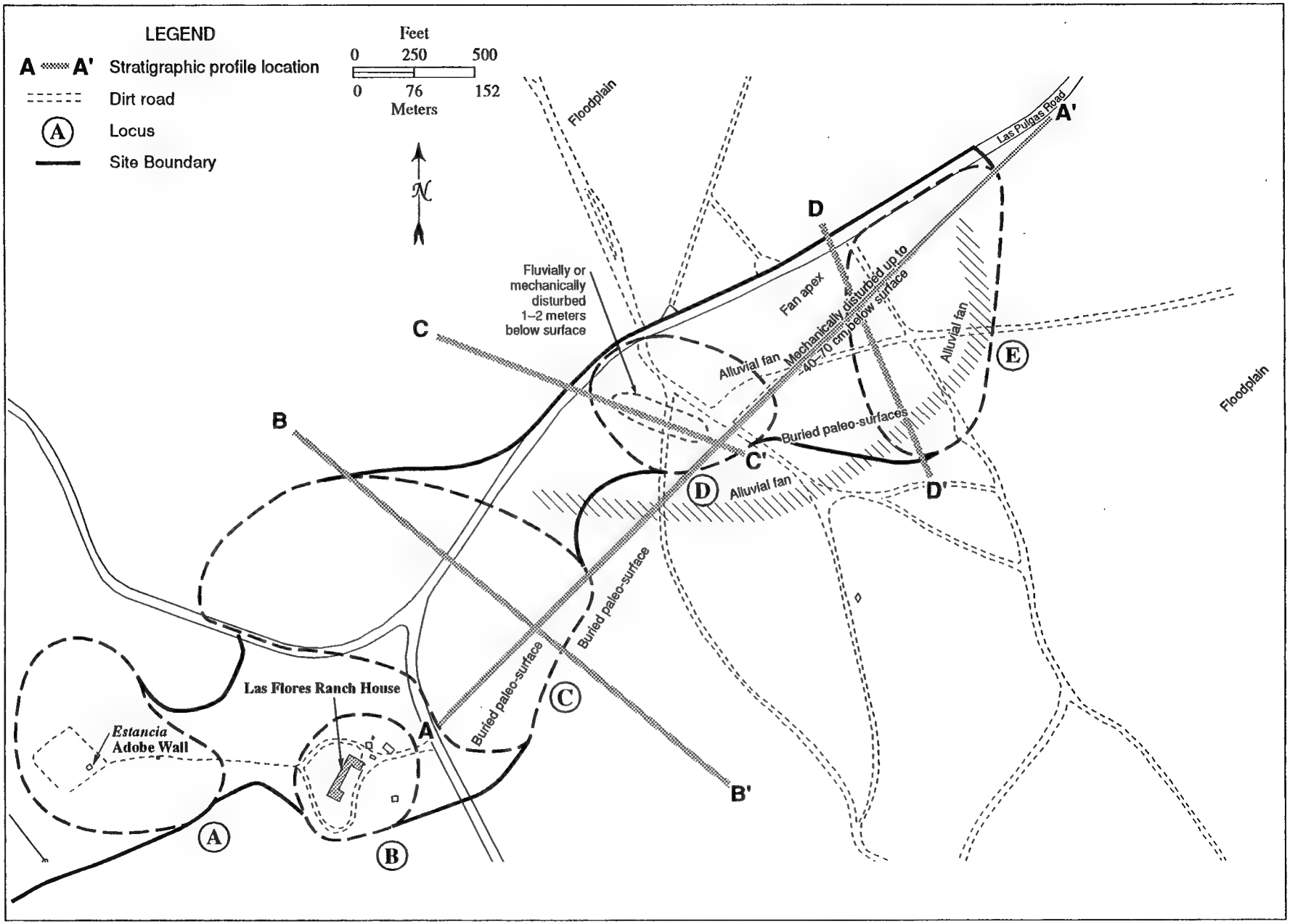



**Figure 5-2. Location of Generalized Stratigraphic Profiles Across SDI-812/H**

Across the northern portion of the fan in Locus E (Trenches 4,5,6, 8, 14, Units 22 and 24, Augers 20 and 22), the material overlying the stratigraphically highest buried A horizon contains a mix of stratified unaltered silty sand (C horizon) and blocks of organic A horizon material. The mixing of these materials seems to be a result of modern mechanical excavations related to agricultural and/or construction activities. Adjacent to the road bed of Las Pulgas Road, the buried A horizon containing midden material is overlain by mechanically processed gravely sand (artificial fill or a mix of local A horizon material and fill; Units 20 and 21). Directly below the disturbed zone, the stratigraphically highest A horizon contains an intact archaeological deposit extending approximately 55 to 80 cm below the ground surface.

Both natural and cultural site disturbances are evident in selected portions of the site. Cultural disturbances generally include construction-related earth-moving activities, agricultural activity, livestock ranching, as well as off-road vehicle activity. Natural processes affecting site integrity include erosion and pedoturbation (soil mixing processes). Pedoturbative processes for this site area limited to graviturbation (soil creep due to gravity) and bioturbation (biologically induced soil mixing).

Historic sources and photographs indicate that all of the slopes around the *Estancia* (Locus A) were plowed for agriculture until the early 1940s. Subsurface deposits in this area have also been impacted by installation of irrigation lines and trees used for landscaping. Subsurface disturbance and compaction of the substratum was also noted at Locus B, the location of the Las Flores Adobe. Soil profiles for units in both Loci A and B show signs of compaction and possible discing in the upper portions of the A horizon. Evidence for additional soil mixing disturbance at the site was also noted in Locus D (Auger A-20 and Trench 3).

Across the site, burial with and without truncation of surface deposits exists along the length of the asphalt roadways. Densities and integrity of the deposits are particularly low within the APE, which has been previously affected by the construction of Las Pulgas Road. The existing roadbeds are approximately 4 to 10 m wider than the paved surfaces and contain up to 1.5 m of artificial fill. Further evidence of road disturbance was noted in the road cut adjacent to STP 10, 11, and 12 (Locus E) and STP 52 and 54 (Locus C). Mixing of fluvial sands and blocks of A horizon material exposed in Locus E (Trenches 4, 5, 6, 7, 8, and 14) suggest that some type of mechanical ripping or mixing of the soils in this area occurred. This disturbance ranges from the surface to depths of 40 to 70 cm.

Natural disturbances are also present in the site matrix. Erosion of material is generally minor on vegetated stable flat-lying surfaces. Steeper slopes and regions occupied by active streams are considered relatively unstable, and it is likely that cultural deposits have been eroded away through gravity and fluvial processes. Bioturbation (floral and faunal soil mixing) is generally limited to the upper soil horizons (A and upper B or C horizons). The majority of the surface horizons exposed at each locus displayed evidence of burrowing insects and roots. Open rodent burrows are present locally at each locus, with *krotovina* (filled burrows) common in the upper portions of the profiles. Within the study area, graviturbation is generally confined to steeper sloping surfaces such as terrace rises. As with most sites, SDI-812/H is located in actively mixed soil horizons.

A more detailed description of the geomorphology, along with selected soil profiles can be found in Appendix A and B of SDI-812/H's *Management Summary* (SAIC 1996b).

## 5.3 CULTURAL MATERIAL FROM SDI-812/H

Prehistoric and historic artifacts were recovered from all site loci. The following counts and weights are based on a 100 percent sample of 1/2-inch, 1/4-inch and 1/8-inch material recovered from the 38 excavation units, with the exception of the fire-affected rock, tile/brick, shell, and macrobotanical categories. In the case of the fire-affected rock and the tile/brick, only 1/2-inch material was incorporated into the final counts and weights because material smaller than 1/2-inch becomes problematic to identify. The shell weights are based on a sample of the excavation material (100 percent of 1/2-inch, 25 percent of 1/4-inch, and 25 percent of 1/8-inch). Sometimes an adjusted shell weight is provided, reflecting the 1/2-inch material and four times the 25 percent sample of the 1/4-inch and 1/8-inch shell remains in order to approximate the true shell weight for all screen sizes. The counts for the macrobotanical remains are based on a sampling strategy entailing a review of all the 1/2-inch material and a scan of 25 percent of the 1/8-inch remains.

### Prehistoric Assemblage

The prehistoric assemblage from the excavation units consists of flaked stone tools, debitage, groundstone, Tizon Brownware ceramics, and a few miscellaneous artifacts.

**Flaked Stone Tools:** This category includes projectile points, bifaces, cores, utilized flakes, and flaked cobbles with signs of modification. The assemblage from SDI-812/H includes 10 projectile points, 11 biface fragments, five cores, 12 utilized/retouched flakes, and 11 modified flaked cobbles, for a total of 49 artifacts. None of the artifacts, except a biface from Unit 7 (Locus A) and a projectile point from Unit 19b (Locus C) were complete, and none of the remaining artifacts were considered temporally diagnostic.

**Debitage:** A total of 4,640 pieces of pieces of debitage was recovered during unit excavations. Most of the fragments were composed of porphyritic and aphanitc (fine-grained) volcanics. In addition, some of the debitage included cherts, quartzite, and quartz. Much of the material defined as volcanic contained river cobble cortex, suggesting that procurement probably took place in nearby creeks and drainages, such as the Piedre de Lumbre Creek. All of the raw materials could have been acquired from local sources. Although some of the chert may have been imported, the majority is similar to the Piedre de Lumbre (PDL) outcrops common to the local area.

In general, the volcanic debitage took the form of large flakes and flaked cobbles, resulting from a percussion stage of production. The cherts were generally worked into projectile points and bifaces, representative of a finishing or pressure flake industry. Although a limited number of flakes were recovered, analysis of the assemblage centered on determining what percentage represented cobble or local as opposed to imported or exotic material; what tools were manufactured or modified from particular material types; and the identification of localized lithic workshops. Combined with other prehistoric artifacts, the density of the flake/debitage category was expected to refine ideas concerning duration of site occupation, intensity of site use, and generalized land-use patterns (particularly mobility and use of imported materials).

**Groundstone:** The groundstone assemblage contained thirty-two fragments of igneous material, consisting of nineteen mano fragments and one pestle fragment. The rest of the remains were too fragmentary and lacked any definable wear pattern, face definition, and/or distinctive shape to characterize more than as undifferentiated groundstone. Most of the groundstone was formed

from igneous cobbles, and no sandstone implements were recovered. In addition, twenty-five fragments demonstrated signs of burning while one piece was stained with asphaltum.

Groundstone was recovered from all loci except Loci D and E. With the exception of artifacts recovered in Units 19, 19a, and 19b, all but one of the fragments was recovered above the 50 cm level.

**Tizon Brownware:** All of the prehistoric pottery (1,393 fragments) were identified as Tizon Brownware, which is typical of coastal San Diego County sites. None of the sherds examined exhibited evidence of fiber temper or heavy carbon streaking, typical of brownwares produced during the Mission Period. Although efforts to assign entry dates to Tizon have met with considerable problems, an introductory date of A.D. 1200-1300 is suggested for northern San Diego County (Laylander 1992).

Twentieth century ethnographic accounts of Luiseño pottery production are varied and inconsistent. Traditional methods of pottery making were identical to those of other Southern California groups (Rogers 1936). Vessels were built up in coils that were fused together by slapping with a wooden paddle against a cobble or ceramic anvil. After the pots were allowed to dry, they were fired in pits (Sparkman 1908:202), or in open fires (Drucker 1937:22), at relatively low temperatures and for a short duration of time.

Brownware types characteristically found in San Luis Rey II sites are manufactured from residual clays containing large amounts of quartz, feldspar, and other minerals (ASM Affiliates 1996:200). Because of the variability in the clay source, individual sherds from the same vessel will exhibit differences in terms of color and thickness. Researchers, including Lyneis (1988) and Wilken (1986) have concluded that it is extremely difficult to isolate temporally or spatially discrete types within this artifact group. Examination of individual sherds from the collection indicated that each piece contained angular to subangular grains of mild quartz, feldspar, and small amounts of hornblende as part of the temper matrix; shell fragments were not noted in the temper. Sherd thickness varied from 0.4 to 0.5 cm. Black residue or carbonized remains were noted on the interior of 10-15 sherds. Macrobotanical and residue studies were not conducted on the carbonized remains.

Overall interpretation of the Tizon was difficult given the small size of the sherds, the lack of diagnostic rims, and the difficulty in defining discrete pottery *types*. Distinctions between mission ware and pre-contact ceramics were not made. Traits proposed to be reflective of mission ware include burnishing, slipping, increased surface decoration, thicker vessel walls, roughly finished rims and walls, shaping on a well or by molding, flatter vessel walls, lug handles, "more exaggerated" rims, spouts, multiple-mouthed vessels, emphasis on bowl and cup forms, and more even firing (Laylander 1992, Issue E-1). Some of these traits are thought to date from the beginning of the mission period, others may have first appeared as late as the end of the nineteenth century. The innovations are attributable, variously, to the use of newly-available technology, to changes in the use to which pottery was being put, to changing cultural norms, and to the external demands of the tourist trade. Because of small number of sherds collected and the size of individual fragments, none of the above traits were definitively identified.

**Miscellaneous Artifacts:** A few miscellaneous artifacts, including shell beads and a possible steatite pipe, were recovered during excavations. These are described more fully under the locus specific discussions.

### Historic Assemblage

Historic and modern debris was recovered in varying densities from all five loci. Materials in this category included bottle glass, historic ceramics, metal fragments, Spanish tile/brick, and modern debris (e.g., plastic and fragments of PVC piping). Recovery of modern debris in some of the units, along with impact from road construction, further substantiates that the area as a whole has been impacted to some degree by agriculture, erosional activity, and modern use. Most of this historic assemblage, with the exception of a few ceramic fragments, was considered temporally and functionally non-diagnostic. The presence of glass, ceramics, metal, and construction materials indicate a historic presence at the site as a whole, but fail to define what activities were carried out at each loci or for how long.

**Glass:** Over 1,000 fragments of glass were recovered from the excavation units at SDI-812/H. Identification of specific time or function was difficult due to the lack of maker's marks and the small size of individual pieces. Reconstruction of whole vessels or estimates for minimal vessel counts was severely hampered by the lack of seams, bases, and bottle necks within the collection. Because of this, analysis centered on differentiated rough time frames based on coloration of individual sherds.

All of the historic glass collected was considered representative of late 19th century manufacture. Coloration included yellow, amber, aqua, olive-green, amethyst, and clear. Both bottle and window glass fragments were collected, along with a few examples of chimney glass. Pieces identified as clear and amber represent modern intrusion or post 1940s glass. Amber fragments most likely represent beer or alcoholic containers while clear glass could represent beverage containers. The modern glass fragments were found throughout the matrix of all loci, although they were concentrated in the top 30 cm of the site.

**Ceramics:** Only 85 fragments of ceramics were recovered from the excavation units, which severely limits interpretation in terms of chronology and/or functional activities. In general, the recovered ceramic fragments were less than 5 cm in length or width, making assignment to a particular functional category (e.g., plate, bowl, saucer, cup) difficult. The lack of maker's marks made it impossible to discuss the number or origin of particular items by manufacturer. The assemblage is dominated by white, undecorated earthenware, and it was difficult to determine whether or not items identified as transferware, painted earthenware, and annular ware could also represent decorated pieces of white earthenware because of their small size. For these reasons, estimates of minimal vessel counts were not attempted.

**Metal:** The majority of the 3,727 metal fragments recovered from the site were small and unidentifiable. Less than 25 percent of the collection could be identified by function. Identified artifacts include can fragments, nails, washers, bolts, and shell casings. Only three artifacts, a .22 rim fire shell casing and two square cut nails, are temporally sensitive. The lack of wire nails in certain loci, however, may indicate a deposition date earlier than the end of the nineteenth century.

**Tile/Brick:** 4,395 fragments of either low-fired tile or brick greater than 1/2-inch screen size was recovered from the site, with over 99 percent from Locus A. All of the roof and floor tile fragments probably date to the mid-nineteenth century. Identification and distinction between fired brick and tile was hampered by the size of individual artifacts, the majority of which was less than 1/4-inch in size.

**Miscellaneous Historic Artifacts:** A few miscellaneous historic artifacts, including glass trade beads and a porcelain button, were recovered during excavations. These are described more fully under the locus specific discussions.

**Faunal and Floral Assemblage**

**Vertebrate Remains:** Animal bone, totaling 23,305 fragments weighing 2,636.2 grams, was recovered from all loci of the site. A sample of the bone was identified and analyzed by the UCLA Zooarchaeology laboratory, and a detailed report of their findings is provided in Section 6.0.

**Invertebrate Remains:** Shell was rough sorted based on 100 percent of the 1/2-inch, 25 percent of the 1/4-inch, and 25 percent of the 1/8-inch screened material. A sample, weighing 11,322.11 grams containing an estimated 24,176 minimum number of individuals, was further identified during analysis. The results of the invertebrate analysis are provided in Section 7.0.

**Macrobotanical Remains:** All charcoal and seeds greater than 1/2-inch and a 25 percent sample of charcoal and seeds greater than 1/8-inch were scanned with a binocular microscope (10-40x magnification). Carbonized plant remains were separated out and identified to the most exclusive taxa. Macrobotanical remains were recovered from four of the five loci at a maximum depth of 170 cm. Five types of seeds were identified to the family or genus level for the site, with Poaceae being the most common taxa. The family Poaceae contains both indigenous and introduced plant species.

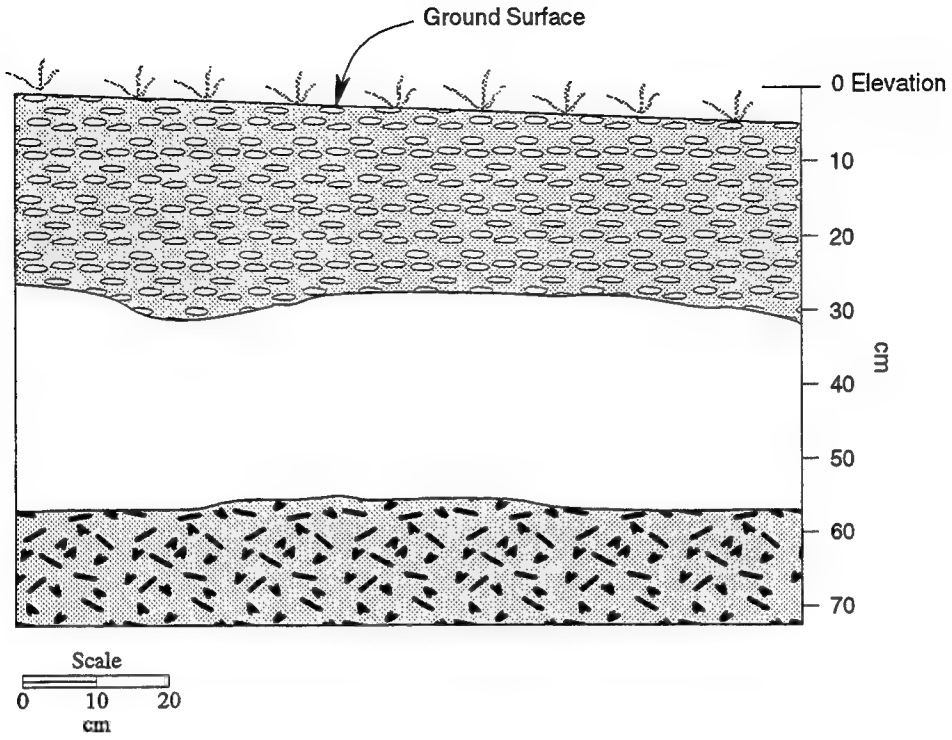
## 5.4 LOCUS A

**Locus Structure**

Locus A is situated on a relatively high fluvial terrace that flanks the valley floor and floodplain. As defined, the area covers approximately 39,016 $m^2$. Twelve test units (Units 1, 2, 3, 4, 5, 6, 7, 7a, 8, 9, 9a, and 29) were excavated to a maximum depth of 60 cm below ground level (6.5 $m^2$). Pieces of bone, shell, and flaked debitage were found eroding out of several rodent burrows, indicating that the *Estancia* was built on an earlier Native American deposit. Similar materials found in the matrix of the standing adobe wall indicate that portions of this earlier deposit were used in constructing the *Estancia*. Historic sources and photographs indicate that all the slopes around the *Estancia* were plowed for agriculture until the early 1940s.

Integrity of this locus ranges between fair to good, depending on location. Cultural deposits in the compound surrounding the *Estancia* ruins extend to approximately 60 cm in depth. A narrow dirt road skirts the northeastern end of the ruin, missing the architectural element but cutting through stratum deposits, exposing fragments of fired brick, shell, and other artifacts. Subsurface deposits have also been impacted by installation of irrigation lines and trees used for landscaping.

The locus contains at least two soil horizons: an A horizon containing cultural materials (extending from ground level to depths between 35 to 60 cm below the surface) and an A/B, Bw, and/or Bt horizon (Figure 5-3). Soil profiles recorded in the units were generally intact, although some evidence of compaction and possible discing in the upper portions of the A horizon were noted. Open rodent burrows are present, with *krotovina* (filled burrows) common in the upper portions of the locus.




A horizon
10 YR 3/2 - Very dark grayish brown
Hard packed silty loam
Cultural material

A horizon
10 YR 2/1 - Black
Hard packed sandy loam
Cultural material

A/B, Bw or Bt horizon
10 YR 4/3 - Brown
Hard packed sandy clay
No cultural material

**Figure 5-3. North Wall Profile of Unit 4 from Locus A**

**Recovery of Cultural Materials**

Varying densities of prehistoric and historic artifacts were recovered from each of the twelve units excavated (Table 5-5). The vertical distribution of cultural material of Locus A is displayed in Figure 5-4.

*Prehistoric Artifacts*

Prehistoric artifacts were found in all twelve units to a maximum depth of 80 cm below surface. The recovered prehistoric assemblage consists of 15 flaked stone tools, 1,129 pieces of debitage, 17 pieces of groundstone, 1,288 pieces of Tizon Brownware, one piece of worked steatite, and one shell bead (Table 5-3).

**Flaked Stone Tools**: Fifteen flaked stone tools (Table 5-6), including two projectile point fragments, three biface fragments, two cores, five possible utilized flakes, and three modified flaked cobbles, were recovered from eight units. Both projectile points and two of the bifaces were recovered from Unit 4. Although the artifacts were collected to a maximum depth of 60 cm, 67 percent were recovered from the first 30 cm. The recovered projectile points were not complete and are not temporally diagnostic.

Three major raw materials were used in tool manufacturing: volcanics, chert, and quartz (Table 5-7). Of the 15 tools recovered from Locus A, seven (46.7 percent) were manufactured from locally obtained volcanic cobbles.

**Debitage**: The overall density of debitage from Locus A (174 flakes/$m^3$) represents the third highest for the entire site (Table 5-4). Material distribution of the debitage is similar to the pattern displayed by the flaked stone tools (Table 5-7). In addition, over three-quarters of the debitage assemblage exhibited some degree of cobble cortex.

Higher numbers of debitage were recovered from Units 4 (22.9 percent of the Locus A debitage assemblage), Unit 3 (13.4 percent), and Unit 29 (10.7 percent), while maximum levels of recovery occurred between 20-40 cm (Figure 5-4).

**Groundstone**: Seventeen fragments of granitic groundstone were recovered from nine of the twelve excavation units. No whole manos or pestles were recovered, and none of the fragments were classified as metates. The undifferentiated groundstone lacked a definable wear pattern, face definition, and/or distinctive shape. None of the 17 fragments appeared to fire-cracked or altered by heat.

**Tizon Brownware**: Sherds were recovered to a maximum depth of 60 cm, with maximum recovery between 20-30 cm (Figure 5-4). Minimal number in terms of vessel count or container size could not be determined due to the fragmented nature of the collection. All the prehistoric sherds were typed as Tizon Brownware.

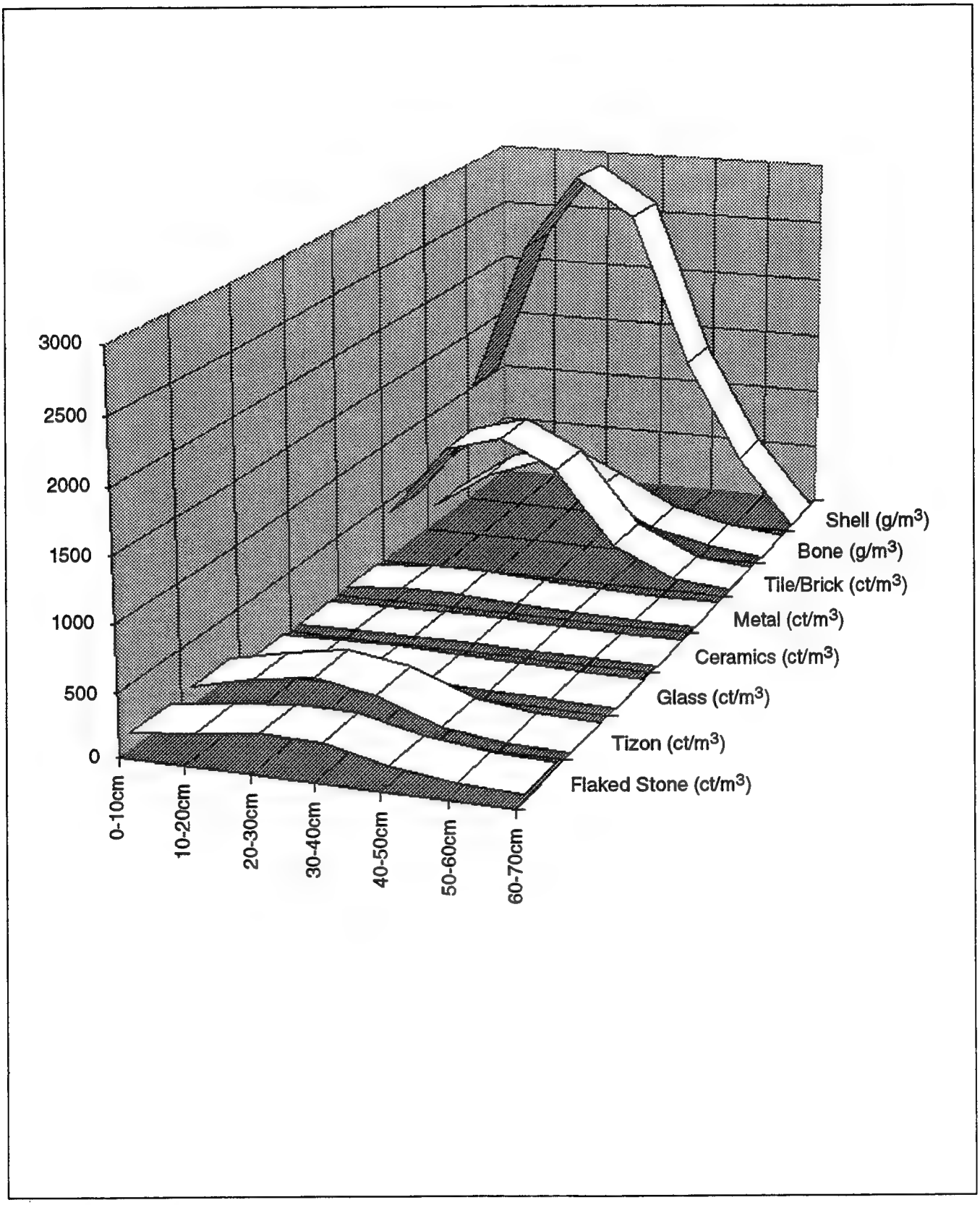



**Figure 5-4. Locus A Vertical Densities**

**Table 5-5. Locus A Cultural Material by Unit**

| *Units* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *7a* | *8* | *9* | *9a* | *29* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Excavated Volume ($m^3$)** | 0.5 | 0.6 | 0.7 | 0.7 | 0.4 | 0.5 | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 | 0.5 |
| **Prehistoric Artifacts** | | | | | | | | | | | | |
| Flake Stone Tools (ct) | 2 | 1 | - | 5 | 1 | - | 2 | 1 | - | - | 1 | 2 |
| Debitage (ct) | 78 | 82 | 151 | 258 | 35 | 69 | 45 | 66 | 54 | 75 | 95 | 121 |
| Groundstone (ct) | 2 | - | 3 | 2 | 3 | - | - | 1 | 1 | 2 | 1 | 2 |
| Tizon (ct) | 12 | 93 | 106 | 88 | 123 | 14 | 208 | 172 | 73 | 197 | 178 | 24 |
| Worked Shell (ct) | - | - | - | - | - | - | - | - | 1 | - | - | - |
| FAR (g) | 34 | 314 | 357 | 192 | 522 | - | - | 2,199 | 278 | 9 | 282 | 150 |
| **Historic Artifacts** | | | | | | | | | | | | |
| Glass (ct) | 5 | 35 | 18 | 4 | 8 | 6 | 16 | 15 | 5 | 37 | 39 | - |
| Ceramics (ct) | - | 5 | 6 | 3 | 2 | - | 4 | 5 | 3 | 17 | 12 | - |
| Metal (ct) | 3 | 22 | 8 | 2 | 11 | 1 | 7 | 21 | 7 | 42 | 89 | 1 |
| Tile/Brick (ct) | 23 | 815 | 735 | 17 | 483 | 4 | 169 | 135 | 863 | 505 | 625 | 12 |
| **Faunal & Floral** | | | | | | | | | | | | |
| Bone (g) | 17 | 105 | 283 | 119 | 80 | 7 | 320 | 311 | 183 | 351 | 382 | 131 |
| Shell (g)[1] | 7,730 | 6,398 | 5,205 | 9,640 | 1,354 | 1,024 | 2,590 | 2,809 | 1,427 | 3,016 | 3,335 | 4,128 |
| Seeds (ct) | 1 | - | - | - | - | - | - | - | - | - | - | - |

[1] Shell equals adjusted weight (100% of 1/2" material and four times a 25% sample of the 1/4" and 1/8" material).

**Table 5-6. Distribution of Flaked Stone Tools from Locus A**

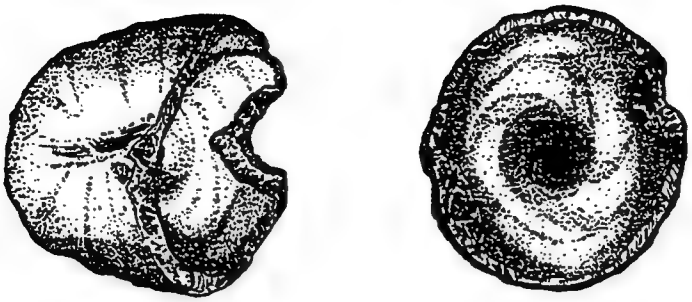
| *Catalog #* | *Provenience* | *Artifact* | *Material* | *Weight (g)* |
|---|---|---|---|---|
| 2093 | Unit 1, 10-20cm | Biface fragment (mid-section) | Quartz | 1.0 |
| 2506 | Unit 1, 20-30cm | Modified flaked cobble | Volcanic | 146.3 |
| 2305 | Unit 2, 40-50cm | Core | Chert | 6.6 |
| 2003 | Unit 4, 20-30cm | Biface fragment (unfinished) | Quartz | 4.2 |
| 2101 | Unit 4, 20-30cm | Possible utilized flake | Volcanic | 50.5 |
| 2095 | Unit 4, 40-50cm | Projectile point fragment (base) | Quartz | 0.5 |
| 2495 | Unit 4, 50-60cm | Projectile point fragment (tip) | Chert | 0.1 |
| 2312 | Unit 4, 50-60cm | Biface fragment (base) | Chert | 1.1 |
| 2496 | Unit 5, 10-20cm | Possible utilized flake | Volcanic | 13.9 |
| 2309 | Unit 7, 20-30cm | Core | Volcanic | 149.3 |
| 2113 | Unit 7, 20-30cm | Modified flaked cobble | Igneous | 89.8 |
| 2497 | Unit 7a, 20-30cm | Possible utilized flake | Volcanic | 50.4 |
| 2498 | Unit 9a, 20-30cm | Possible utilized flake | Volcanic | 2.8 |
| 2507 | Unit 29, 20-30cm | Modified flaked cobble | Granitic | 425.1 |
| 2503 | Unit 29, 40-50cm | Possible utilized flake | Volcanic | 11.0 |

**Table 5-7. Locus A Flaked Stone by Material Type**

| *Material* | *Debitage* | *Flakes with Cortex* | *Flaked Stone Tools* | *Average Flake Thickness* |
|---|---|---|---|---|
| Volcanic | 59.4% | 97.6% | 46.7% | 4.8 |
| Chert | 17.2% | 1.5% | 20.0% | 1.2 |
| Quartz | 21.6% | 0.9% | 20.0% | 6.9 |
| Other | 1.8% | - | 13.3% | - |

**Miscellaneous Artifacts**: A single piece of worked steatite (Catalog # 2688) was recovered from Unit 4 between 40-50 cm (Figure 5-5). It is elongated in shape and measures 2.9 cm in length and 3.1 cm in width. The central portion of the artifact has been drilled and shaped to form a cylindrical body. Although the exact function of this artifact is unknown, it is possible that it represents a net weight or the beginnings of a stone pipe.

In addition, one *Olivella biplicata* shell bead (Catalog # 3146) was recovered from Unit 8 between 20 and 30 cm below the surface. The artifact is characteristic of an *Olivella* Full Lip bead, according to Gibson's (1992) descriptions. The size of the bead is 6.1 mm by 6.8 mm with a conical perforation ranging from 1.2 mm to 1.7 mm in diameter. The thickest portion of the bead measures 2.5 mm. Half of the dorsal side of the bead is incised with a series of parallel lines. This type of bead is generally diagnostic of Phase 2b of the Late Period (ca. A.D. 1650-1782) for the Santa Barbara Channel region (Gibson 1992; King 1990) and was used and traded widely throughout central and southern California (King 1978).



Worked Steatite
Unit 4, 40-50cm BS
Catalog No. 2688

**Figure 5-5. Worked Steatite from Locus A**

*Historic Artifacts*

Historic materials recovered from Locus A include 188 pieces of glass, 57 ceramics fragments, 214 pieces of metal, 4,386 fragments of tile or fired brick, and one glass trade bead (Tables 5-3 and 5-5).

**Glass:** None of the 188 glass fragments exhibited a diagnostic feature, such as a maker's mark, lip, or base. Although the material is highly fragmented, most of the glass appears to be from containers (i.e., bottles). Examples of other types of glass objects, such as mirrors, lanterns, or windows, were not found. The most common glass color was clear (usually associated with modern or post-1940s medicinal, liquor, or food containers), followed by a light olive-green (usually associated with wine or champagne bottles) and aqua (usually medicinal products). Eight of the units (Units 1, 2, 3, 4, 5, 8, 9, and 29) contained examples of "older" manufactured glass (based on presence of patina and color) dating to the 1800s rather than the 1900s. For example, dark green or *black glass*, which was manufactured in the 1800s, was recovered from Unit 5 (30-40 cm) and Unit 8 (20-30 cm). In addition, Schaefer's testing of Locus A resulted in the recovery of three fragments of what was described as small pieces of dark colored and heavily patinated glass (Schaefer 1992: Section 7, pg. 4). The recovery of potentially "older" manufactured glass would correlate with the general time frame established for the *Estancia*.

**Ceramics:** The small number of ceramics collected from Locus A severely limits interpretation in terms of chronology and functional activities. Unlike the distribution of metal and glass (peaking at 20-30 cm), the heaviest recovery of ceramics occurred at the 30-40 cm level (Figure 5-4). Some of the fragments from SAIC's excavations as well as one fragment from Schaefer's testing (Schaefer 1992, Section 7, pg 4), have been identified as blue floral transferware or *willow-ware*, which was made by British potters from 1815 to present day.

The mixture of low status Euroamerican and indigenous ceramics (Tizon Brownware) correlates well with what is known of the *Estancia*. During the Mission period, priests occupied the *Estancia* only sporadically, and, like the mission fathers before them, the Pico family probably did not use the *Estancia* either. Thus, ceramics associated with high status individuals were not found. The presence of Euroamerican ceramics does not imply sole use by non-Native Americans because, according to information from other missions, Euroamerican ceramics were also used in limited quantities by mission neophytes (Costello 1990:325).

**Metal**: Only 11 of the 214 metal fragments were identifiable in terms of function or form. These pieces included a .22 rim fire shell, two square-cut nails, and various fragments of washers and bolts. The remaining metal pieces were probably remnants of tin cans and construction-related material. The lack of wire nails in the assemblage may indicate a deposition date earlier than the end of the 19th century, while the recovery of tin cans (some likely sanitary) indicates a date of post 1860s.

**Tile/Brick**: The tile category consists of fragments of low fired roof tiles (*tejas*) and floor tiles (*ladrillos*), dating to the Spanish and Mexican period. Roof tiles would have been more common since floor tiles were restricted to room interiors and some architectural detailing. Most of the recovered tile fragments could not be separated into roof and floor categories. In addition, a small number of mortar and adobe brick fragments were recovered but were considered too small to be diagnostic.

The largest concentration of tile and brick was noted in the 10-20 cm level. This "layer" of building material probably formed as the *Estancia* fell into ruin or was demolished. During the process, both roof and floor tiles would have been scattered in and around the structure. The recovery of fragments to a depth of 60 cm suggests that plowing and site disturbance has moved these materials downward into the soil profile. Heavier concentrations of tile were found in Units 2, 3, 5, 8, 9 and 9a (Table 5-5). These units, with the exception of 9 and 9a, are located close to the *Estancia* ruin. The lack of complete or nearly complete tile fragments may reflect the removal of building material in the 1860s during construction of the Las Flores Adobe Ranch House.

**Miscellaneous Historic Artifacts**: One circular shaped historic trade bead (Catalog # 626) was recovered from Unit 7 between 20 and 30 cm in depth. The bead measured 8 mm in diameter, with a center-drilled hole for stringing. The artifact was light brown in color. Although the bead is temporally non-diagnostic, it likely represents post-contact period.

### *Faunal and Floral Remains*

**Vertebrate Remains**: Approximately 18,000 fragments of animal bone, weighing 2,287.8 grams, were collected from the twelve units of Locus A (Tables 5-3 and 5-5). This represented the highest bone density for the entire site (Table 5-4). Larger bone concentrations within Locus A were recovered from Units 7, 7a, 9, and 9a, which were all located east of the adobe ruin. The UCLA Zooarchaeology laboratory analyzed a sample of 4,368 elements from Locus A. The identified assemblage consisted primarily of domesticated species, such as cattle, sheep, and pig. Little faunal evidence of prehistoric occupation was discernible. In addition, no evidence of butchery or processing was noted. A detailed faunal report is presented in Section 6.0.

**Invertebrate Remains**: Close to 50,000 grams of shell were collected from Locus A (Table 5-3). In terms of overall density, Locus A has the second highest density of shell, with an average of 7,486

g/m³ (Table 5-4). Greater concentrations were recovered in Units 1 through 4 (Table 5-5), which may indicate the presence of discrete activity areas or dump zones. It is interesting to note that the densest concentrations of bone and shell come from different units. Unlike the bone distribution, which was concentrated on the east side of the adobe ruin, denser areas of shell appear to be west of the adobe melt (with the exception of Unit 4). All of the units exhibited a unimodal distribution (Figure 5-4), suggesting a single episode of occupation or multiple occupations over a relatively brief time. The sample analysis of Units 4 and 9 yielded 3,184 g of shell represented by eleven different taxa. *Donax gouldii* made up over 95 percent of the total shell by weight and 99 percent by MNI. The remaining material consisted of *Mytilus* as well as trace amounts of other taxa. A detailed invertebrate report is presented in Section 7.0.

**Macrobotanical Remains**: A single macrobotanical remain was recovered from Locus A (10-20 cm level) and was identified as an Old World species, *Triticum*. The genus *Triticum*, or wheat, is a member of the grass family and is a common cultivar. *Triticum* seeds are larger than most indigenous grass seeds, differentiating them from other grasses identified at the site (see Section 8.0 for more details). Agriculture at SDI-812/H, including the cultivation of grains (probably wheat), was practiced during the Mission *Estancia* period of occupation, as well as during the Indian Pueblo Period. The Picos also sowed fields of grain at Las Flores after they gained control of the pueblo from the Luiseño (Schaefer 1992).

### Chronology

The site of SDI-812/H was first occupied by prehistoric Indians and later by the ethnohistoric Luiseño. In the Spanish Period, it became a Rancho of Mission San Luis Rey. Locus A contains the ruins of the Las Flores *Estancia*, a Mission Period compound built on a prehistoric/ethnohistoric midden deposit. The *Estancia* consisted of a cattle ranch with an upgraded chapel, some liturgical facilities, and the ability for Mass to be said on an irregular schedule (Schaefer 1992, Section 8:2). By 1823, Mission fathers had constructed a patio-shaped compound at Las Flores complete with granaries and a tiled roof. Further construction followed and by 1827 Las Flores consisted of an Indian village, a house for the *mayordomo*, granaries, a chapel, bell tower, and other liturgical rooms (Brigandi 1982; Rosenthal and Padon 1994). The site became an Indian Pueblo after Mission secularization (1833), although Pio Pico eventually gained title to the property in 1844. Native Americans continued to reside there but finally left around 1855.

Two shell samples from Locus A were submitted for radiocarbon analysis (Table 5-2), one from STP 43 (20-40 cm level) located next to Unit 4 and the other from STP 44 (20-40 cm) located adjacent to Unit 2. Radiocarbon dating of the samples provided two-sigma calibrated ranges of AD 1845-1950 and AD 1705-1950, respectively. In addition, the recovered wheat seed could have been associated with the granaries Fr. Peyri described for the *Estancia* (Englehardt 1921 in Schaefer 1992). Faunal materials identified from Locus A are dominated by large mammal remains as well as remains of domesticated mammals (cattle, sheep, and pig). Taken in combination, the archival, radiocarbon, floral, and faunal evidence clearly demonstrates that Locus A dates to the post-contact/historic period. The small number of diagnostic artifacts recovered from this locus, however, lack the temporal sensitivity needed to refine this chronology any further.

### Locus A Summary

Locus A yielded the site's highest density of Tizon Brownware, Spanish tile/brick, and animal bone as well as the second highest density of groundstone, fire-affected rock, glass, historic

ceramics, and invertebrate remains. The high density and diversity of recovered materials suggest residential activities.

Vertical distributions are generally unimodal for the locus, with most material types exhibiting a fairly similar vertical pattern. The highest density of most material types was recovered between 20-30 cm in depth. There is, however, spatial variability in the distribution of material between units. Higher densities of animal bone (Units 7, 7a, 9, and 9a), shell (Units 1, 2, and 4), Tizon Brownware (Units 7, 7a, 9, and 9a), flaked stone (Unit 4), metal (Unit 9a), and glass (Units 2, 9, and 9a) were found down slope from the *Estancia*. These patterns may indicate the presence of a trash dump or midden deposit away from the actual building. Furthermore, the higher recovery rate of shell in Unit 1 and flaked stone/shell in Unit 4 may indicate the presence of discrete activity areas possibly associated with prehistoric rather than historic occupations.

As shown in Table 4-1, five of the 12 units had deep profiles, extending below 50 cm in depth. These units are located south/southeast of the *Estancia* ruins and may suggest more intensive use of the site area. Faunal remains recovered from the area represented the most taxonomically diverse array of mammals for any of the examined areas. Although no evidence of butchering or processing was found, it is interesting to note that Loci A and B are the only areas of the site to yield discretely identified remains of domesticated animals. Based on the faunal study, it is possible that occupants of Loci A and B controlled access to or preferential distribution of domestic animal products.

## 5.5 LOCUS B

### Locus Structure

Locus B is located on a floodplain down slope from Locus A, with elevations ranging between 20-21 m (65-70 feet) amsl. As defined, the area covers approximately 18,241 $m^2$ and includes the Las Flores Adobe Ranch House (1867- current period). Three units were excavated around the perimeter of the ranch house, with maximum depths of the units ranging between 40 and 60 cm below surface. Archival data (Wee and Mikesell 1991) suggests that features such as historic privies once associated with the ranch house may be present, although the current testing program did not locate any such deposits. Locus B is actively used as a Boy Scout Camp.

Similar soil profiles are exhibited for both Loci A and B, which includes a well-developed A horizon containing cultural materials to a depth of 35-60 cm below surface, an A/B or Bw horizon, and a Bt horizon (Figure 5-6). The generally high degree of soil development in both Loci A and B forms a stable surface that lacks the potential for buried soil deposits. Profiles recorded in the units were generally intact, although some evidence of compaction and possible discing in the upper portions of the A horizon were noted. Bioturbation (floral and faunal soil mixing) is generally limited to the upper soil horizons (A and upper B or C horizons) and controlled by the depth of animal burrows and root growth. In general locus integrity is fair; open rodent burrows are present, with *krotovina* common in the upper portions of the profiles. In addition, the ground surface exhibits low to moderate surficial disturbance, depending on location.

### Recovery of Cultural Materials

Both prehistoric and historic artifacts were recovered from the three units. Locus B yielded the site's highest densities of historic glass, ceramics, metal, debitage, flaked stone tools, groundstone,

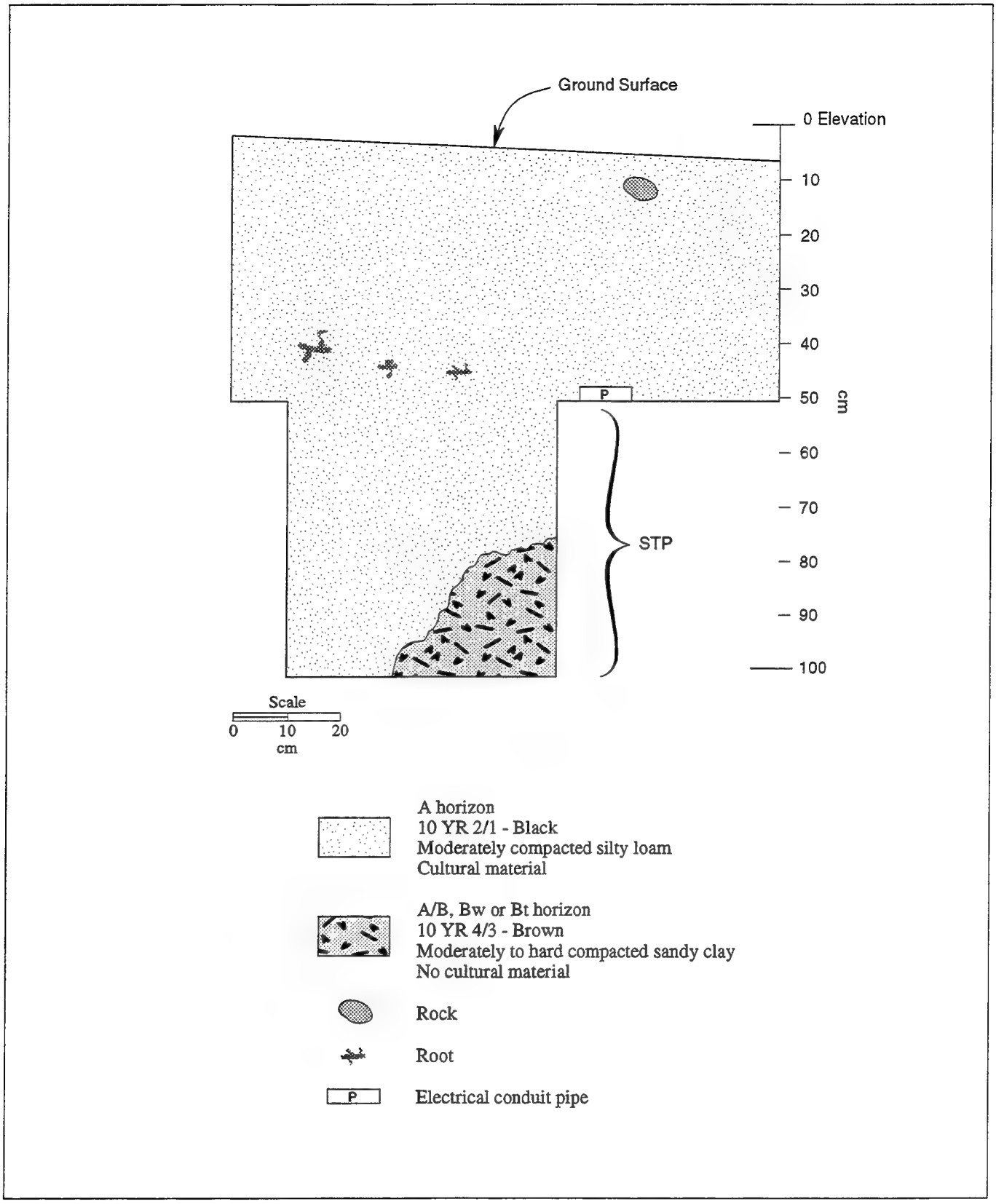



**Figure 5-6. North Wall Profile of Unit 33a from Locus B**

and fire-affected rock (Table 5-4). The distribution of cultural material by excavation unit is listed in Table 5-8 while a graph of the vertical distribution is provided in Figure 5-7.

*Prehistoric Assemblage*

Prehistoric artifacts were recovered in all three units, to a maximum depth of 60 cm below surface. The recovered prehistoric assemblage consists of 13 flaked stone tools, 798 pieces of debitage, 8 fragments of groundstone, and 14 pieces of Tizon Brownware (Tables 5-3 and 5-8). The shell and bone are likely prehistoric as well, but radiocarbon dating would be required to address the issue further.

**Table 5-8. Locus B Cultural Material by Unit**

| | *Unit 30* | *Unit 31* | *Unit 33a* |
|---|---|---|---|
| **Excavated Volume ($m^3$)** | 0.4 | 0.6 | 0.5 |
| **Prehistoric Artifacts** | | | |
| Flake Stone Tools (ct) | 7 | 1 | 5 |
| Debitage (ct) | 303 | 139 | 356 |
| Groundstone (ct) | 6 | 2 | - |
| Tizon (ct) | 2 | 7 | 5 |
| Worked Shell (ct) | - | - | - |
| FAR (g) | 2,722 | 211 | 556 |
| **Historic Artifacts** | | | |
| Glass (ct) | 394 | 111 | 118 |
| Ceramics (ct) | 12 | 1 | 10 |
| Metal (ct) | 2,090 | 128 | 407 |
| Tile/Brick (ct) | - | 1 | 6 |
| **Faunal & Floral** | | | |
| Bone (g) | 44 | 35 | 86 |
| Shell (g)[1] | 1,620 | 5,768 | 692 |
| Seeds (ct) | - | - | - |

1 Shell equals adjusted weight (100% of 1/2" material and four times a 25% sample of the 1/4" and 1/8" material).

**Flaked Stone Tools**: Thirteen flaked stone tools, including one biface, three cores, three possibly utilized flakes, and six modified flaked cobbles, were recovered from Locus B (Table 5-9). Ten of the 13 artifacts (77 percent) were collected from the first 30 cm of excavation. In addition, the majority of artifacts (77 percent) were composed of volcanic material (Table 5-10).

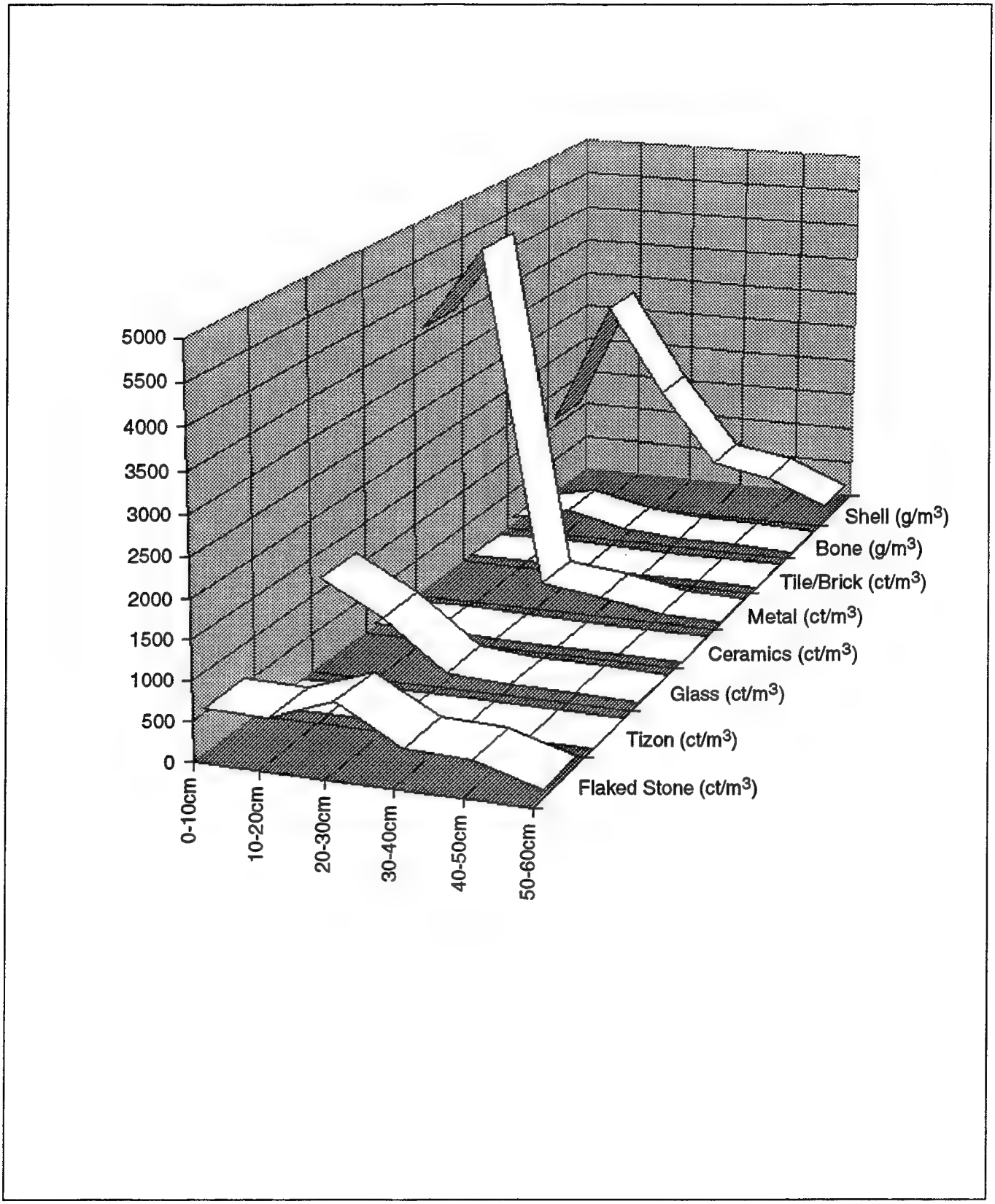



**Figure 5-7. Locus B Vertical Densities**

**Table 5-9. Distribution of Flaked Stone Tools from Locus B**

| *Catalog #* | *Provenience* | *Artifact* | *Material* | *Weight (g)* |
|---|---|---|---|---|
| 1864 | Unit 30, 20-30cm | Possible utilized flake | Volcanic | 54.1 |
| 2504 | Unit 30, 20-30cm | Possible utilized flake | Volcanic | 57.6 |
| 2504 | Unit 30, 20-30cm | Possible utilized flake | Volcanic | 8.5 |
| 1878 | Unit 30, 20-30cm | Modified flaked cobble | Volcanic | 93.0 |
| 2508 | Unit 30, 20-30cm | Modified flaked cobble | Volcanic | 93.7 |
| 1878 | Unit 30, 20-30cm | Battered flaked cobble | Volcanic | 136.2 |
| 2511 | Unit 30, 20-30cm | Battered flaked cobble | Volcanic | 287.7 |
| 2098 | Unit 31, 20-30cm | Biface (mostly complete) | Chert | 18.7 |
| 2103 | Unit 33a, 10-20cm | Core | Quartzite | 241.0 |
| 2509 | Unit 33a, 20-30cm | Battered flaked cobble | Volcanic | 54.2 |
| 2510 | Unit 33a, 30-40cm | Modified flaked cobble | Volcanic | 123.3 |
| 1877 | Unit 33a, 40-50cm | Core | Volcanic | 88.2 |
| 1877 | Unit 33a, 40-50cm | Core | Quartz | 181.8 |

**Table 5-10. Locus B Flaked Stone by Material Type**

| *Material* | *Debitage* | *Flakes with Cortex* | *Flaked Stone Tools* | *Average Flake Thickness* |
|---|---|---|---|---|
| Volcanic | 66.8% | 89.0% | 76.9% | 5.4 |
| Chert | 20.9% | 9.0% | 7.7% | 1.8 |
| Quartz | 11.5% | 13.2% | 7.7% | 6.1 |
| Other | 0.8% | - | 7.7% | - |

**Debitage**: The three units excavated in Locus B contained the highest density of debitage for the entire site, with an average of 532 flakes per $m^3$ (Table 5-4). The debitage was composed of primarily volcanic material, chert, and quartz (Table 5-10).The high density of flake material may suggest that specific areas within Locus B were used as lithic reduction stations for locally obtained volcanic cobbles. As with Locus A, the dominant activity appears to be core reduction and tool manufacture requiring percussion techniques.

**Groundstone**: Eight pieces of groundstone were recovered, including four mano fragments and one pestle fragment. The remaining fragments of undifferentiated groundstone lacked any definable wear pattern, face definition, and/or distinctive shape. All of the groundstone was composed of granitic material.

**Tizon Brownware**: Fourteen pieces of Tizon Brownware were recovered to a maximum depth of 40 cm below surface. Because of the low recovery of this artifact type and the degree of fragmentation, estimates of minimal vessel count could not be made.

The low density of Tizon Brownware in Locus B, in contrast to the high amounts present in Locus A, may be a reflection of time period when the Las Flores Adobe was built. Archival data suggest that most, it not all, of the indigenous inhabitants who would have used these ceramics had been removed from the *rancho* after the Adobe was built.

**Miscellaneous Artifacts**: No beads, ornaments, or shell pendants were recovered from Locus B.

*Historic Artifacts*

Locus A contained the highest density of most types of historic materials, with an average density of 415 pieces of glass/$m^3$, 15.3 pieces of ceramics/$m^3$, and 1,750 metal fragments/$m^3$ (Table 5-4).

**Glass**: Clear glass, which is common after the first quarter of the twentieth century (Wilcoxon et al. 1986:72), is the most common color found in the Locus B assemblage. Unlike Locus A, several small fragments of thin clear glass were found, suggesting the presence of lantern globe or chimney glass. Some fragments of glass can be considered "older" based on glass coloration and vessel style. Heavily patinated glass fragments were recovered in levels 10-30 cm. In addition, a number of pieces of sun-colored glass, whose amethyst coloration is due to the presence of magnesia during manufacture (Jones and Sullivan 1985:13-14), were also recovered. This type of glass was common between 1875 to 1918. Finally, one complete Florida water bottle was recovered from Unit 33a. Manufacture techniques on this bottle indicate a manufacture date between 1875-1920s. Based on coloration and the recovery of a single Florida water bottle, the glass assemblage for Locus B appears to fall between 1870 and 1950s, a time period roughly 35 years later than Locus A. This time span correlates well with the known use of the Las Flores Adobe Ranch House.

**Ceramics**: The ceramic assemblage is dominated by utilitarian tablewares composed of transferware, whitewares, and vitreous china. Five fragments of a brown stoneware vessel were recovered from Unit 33a, which may be from a Chinese vessel although its small size makes identification tentative. It is also possible that these fragments represent the remains of an ink well or a domestic piece of stoneware. In addition to the tableware, one ceramic clothing button (vitreous porcelain) was recovered from Unit 31 (0-10 cm). This artifact is not considered temporally sensitive.

**Metal**: Although a large number of metal fragments were collected (2,625), only twenty-three pieces could be identified. Identified metal includes nails, bolts, and copper wire. Much of the recovered material is of recent manufacture, dating to the early twentieth century or later; however, several square-cut nails, which pre-date this more modern material, were recovered from Unit 33a (20-40 cm).

**Tile/Brick**: Historic building materials, such as roof and floor tiles, were recovered in small amounts from the three units. Although most of the tile and brick fragments were recovered from the first 20 cm of excavation, one small tile fragment was discovered over 80 cm below the surface in an STP dug into the floor of Unit 33a, suggesting that soil disturbance has moved this material downward in the profile. In contrast to Locus A, very little building material was recovered for Locus B, and these differences in recovery could reflect differences in use or building technology between the two areas.

**Miscellaneous Historic Artifacts**: No trade beads or other miscellaneous artifacts were recovered from Locus B.

*Faunal and Floral Remains*

**Vertebrate Remains**: Approximately 1,322 pieces of bone, weighing 165.4 grams, were recovered from Locus B. This was the second highest density for recovered bone across the entire site (Table

5-4). The UCLA Zooarchaeology Laboratory identified over 300 elements. The Locus B assemblage, like Locus A, is dominated by large mammal remains, including domesticated mammals (cattle, sheep, pig), while domesticated species were lacking in Loci C, D, and E. In addition, Locus B produced the only identifiable skeletal elements bearing cut marks (two cow ribs with metal knife slices).

**Invertebrate Remains**: Approximately 8,080 grams of shell were recovered from three units, which is the third highest density for the entire site (Table 5-4). Shell samples were taken from Units 31 and 33a for species analysis. As with Locus A, *Donax gouldii* was the dominant species recovered, representing over 88 percent of the shell by weight and close to 100 percent by identifiable MNI. *Argopecten aequisulcatus* and *Olivella biplicata* were the only other shell taxa identified from this locus. The low diversity of shellfish recovered from the three units was partly due to the highly fragmentary, and therefore unidentifiable, nature of the collection. The poor condition of the shell is likely associated with long-term, post-depositional disturbance from historic and modern activities. A detailed invertebrate report is presented in Section 7.0.

**Macrobotanical Remains**: None were collected from Locus B.

### Chronology

Although no radiocarbon samples were submitted from Locus B, archival information regarding the construction of Las Flores Adobe Ranch House demonstrates that this area was inhabited by at least 1867. Cultural materials recovered from Locus B contain a diverse assemblage dating from the entire span of occupation in the 1860s to at least the 1940s or 1950s. The vertical placement of the historic artifacts does not appear to show any significant patterning. Nineteenth century artifacts, such as whitewares, colored glass, and square-cut nails do not cluster in the lower levels, but are found throughout the soil profile. In addition, materials dating to different time periods are found within the same level, and older artifacts are not restricted to the lower levels. Finally, the presence of cattle and other domesticates in the assemblage, some of which had metal cut marks, also suggests a historic occupation. The presence of lithic tools, debitage, groundstone, and shell suggest the presence of a prehistoric or protohistoric deposit, but it is conceivable that these artifacts were made by Native Americans while working at the historic cattle ranch.

### Locus B Summary

Locus B yielded the site's highest densities of historic glass, ceramics, metal, debitage, flaked stone tools, groundstone, and fire-affected rock. The time span of the datable historic artifacts and the presence of domesticated mammal remains corresponds well with the known occupation of the Las Flores Adobe Ranch House (ca. 1867-present). In addition, the density and diversity of the recovered materials suggest some level of residential behavior.

Vertical distributions of historic and prehistoric material are slightly different, with the majority of the historic artifacts collected from 10-20 cm below surface and prehistoric materials from 20-30 cm below surface. This difference probably reflects the presence of a historic component (associated with the Las Flores Adobe) on top of a prehistoric midden. Because of the small sample size (three units), horizontal differences throughout the locus are difficult to interpret. Unit 31 contained the highest density of shell; Unit 33a the highest density of bone; and Unit 30 the highest density of glass, metal, and fire-affected rock (Table 5-8). Unit 30 also had a random conglomeration of unmodified alluvial and angular rock. It is unclear whether the unmodified rock scatter

represented a cultural or natural formation based on the exposure of a 1 m x 1 m area. The differences in material densities between units may be reflective of specific activity areas across the locus or may simply be a product of the small sample size of testing.

## 5.6 LOCUS C

### Locus Structure

Locus C is located up valley from Loci A and B at an elevation between 20-24 m (65-80 feet) amsl in an area measuring 86,140 $m^2$. Sixteen units (7.8 $m^3$) were excavated to depths ranging from 20 cm to 190 cm below surface. Three units (19, 19a, and 19b) were part of an L-shaped block exposure. In addition, the top 120 cm of non-cultural material was removed with a backhoe in four units (14, 19, 19a, and 19b) in order to reach deeply buried cultural deposits. The cultural deposits within the units were then hand excavated in standard ten centimeter levels.

Two distinctive stratigraphic deposits are present in this area, one containing a moderate density of historic and prehistoric materials between 0-60 cm below surface and a buried prehistoric component between 130-180 cm below surface. The buried deposits represent a pre-contact Luiseño residential occupation that is relatively free of rodent and other site disturbance. Overall, there are no standing structures, ruins, or evidence of historic activity (other than roads) on the surface of Locus C.

The generalized soil stratigraphy for Loci C is more complicated than for the other loci due to an active alluvial setting. The upper portion of the Locus (north of Las Pulgas Road) is located on a fluvial terrace. On the terrace surface there is a cultural A horizon approximately 20-40 cm thick underlain by a sterile C horizon (Figures 5-1 and 5-2). The eastern margin of the terrace (south of Las Pulgas Road) is buried by younger or unaltered fluvial sands that extend to depths between 80-160 cm below grade. This C horizon, in turn, overlies a well developed, buried Ab horizon that was found in Units 14, 19 (Figure 5-8), 19a, and 19b; Trenches 1, 10, 11, 12, and 13; and Augers 17-19. The buried A horizon varies in depth from 15 to 40 cm in thickness and yielded cultural materials at all excavation locations except for Trench 1 and Augers 17-19.

Site integrity varies from good to excellent except where Las Pulgas Road and Stuart Mesa Road impact the site. Additional disturbance was noted along a graded dirt road lying northwest between STPs 52 and 54. Surficial as well as buried cultural deposits occur throughout the locus. Rodent disturbance is present; however, defined stratigraphic boundaries indicate that the cultural deposits have retained their overall integrity. Tank traffic and cultivation have affected the uppermost deposit, evidenced by numerous depressions and mounds. The buried deposits, in particular, exhibit excellent integrity.

### Recovery of Cultural Materials

Varying densities of culture material were recovered from all excavation units (Table 5-11). The vertical distribution of the various types of artifacts is displayed graphically in Figure 5-9.

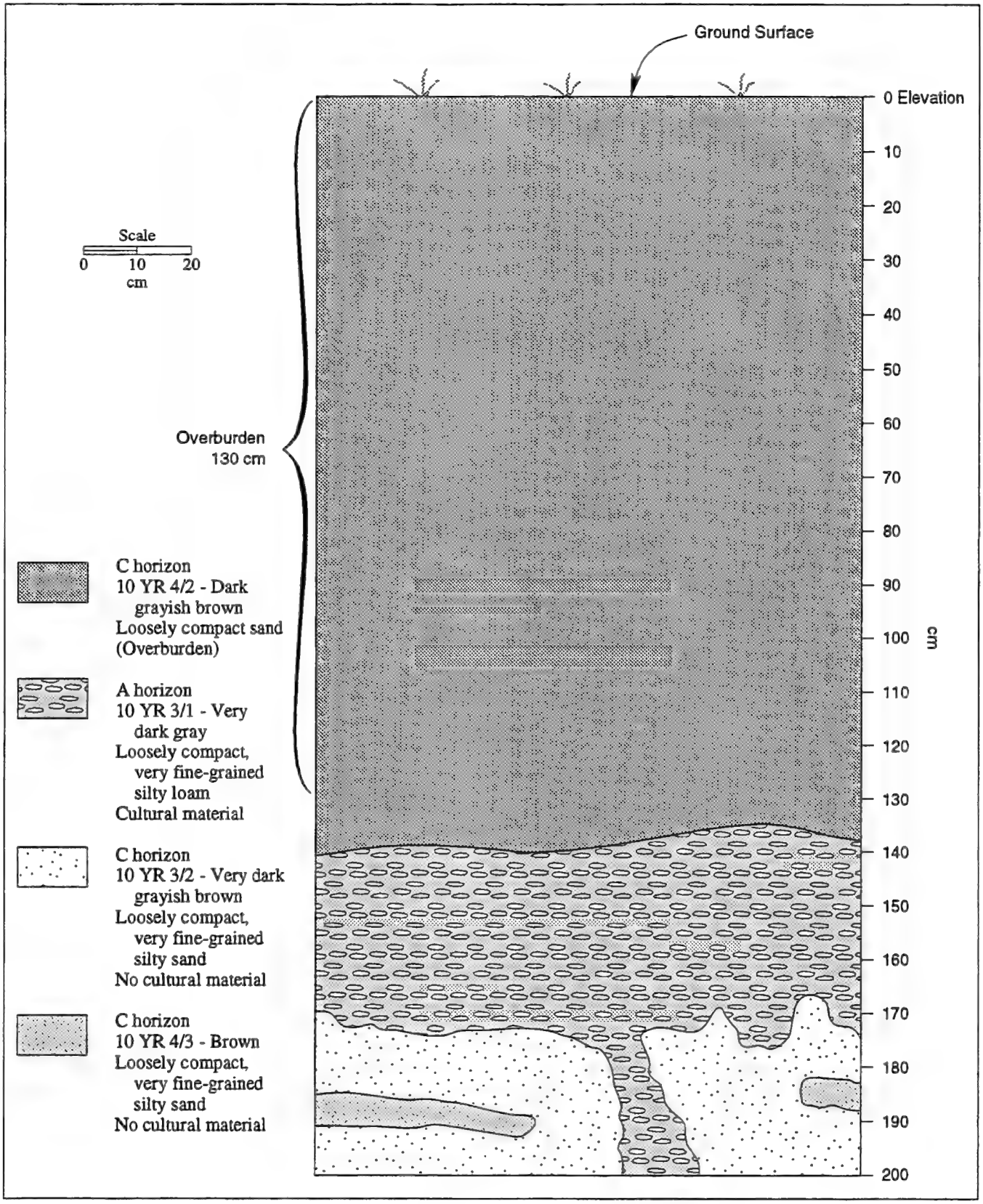



**Figure 5-8. North Wall Profile of Unit 19 from Locus C**

**Table 5-11. Locus C Cultural Material by Unit**

| *Units* | *10* | *11* | *12* | *13* | *14* | *15* | *16* | *17* | *18* | *19* | *19a* | *19b* | *26* | *27* | *28* | *32* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Excavated Volume ($m^3$)** | 0.6 | 0.3 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.7 | 0.2 | 0.6 | 0.5 | 0.5 | 0.6 | 0.5 | 0.6 | 0.5 |
| **Prehistoric Artifacts** | | | | | | | | | | | | | | | | |
| Flake Stone Tools (ct) | 1 | - | - | - | - | - | - | 1 | - | 8 | 2 | 5 | - | 2 | - | - |
| Debitage (ct) | 57 | 12 | 28 | 45 | 55 | 100 | 90 | 118 | 8 | 622 | 559 | 546 | 52 | 89 | 15 | 43 |
| Groundstone (ct) | - | - | - | - | 1 | - | - | - | - | 3 | - | 2 | - | 1 | - | - |
| Tizon (ct) | 1 | - | 3 | 3 | 3 | 12 | 6 | 12 | - | 16 | 9 | 9 | 1 | 2 | 4 | 3 |
| Worked Shell (ct) | - | - | - | - | - | - | - | - | - | 2 | 1 | - | - | - | - | - |
| FAR (g) | 40 | 18 | 31 | 73 | 114 | 84 | 256 | 478 | - | 776 | 118 | 406 | 222 | 35 | 167 | 5 |
| **Historic Artifacts** | | | | | | | | | | | | | | | | |
| Glass (ct) | 134 | 1 | 1 | 6 | 1 | 2 | 6 | 2 | - | - | - | - | - | 5 | 8 | 17 |
| Ceramics (ct) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Metal (ct) | 242 | - | - | 4 | 4 | 5 | 1 | 109 | - | - | - | - | 14 | 3 | 148 | 28 |
| Tile/Brick (ct) | - | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - |
| **Faunal & Floral** | | | | | | | | | | | | | | | | |
| Bone (g) | 7 | <1 | 1 | <1 | 6 | 1 | <1 | 7 | <1 | 41 | 36 | 36 | 8 | 1 | 2 | <1 |
| Shell (g)[1] | 213 | 1 | 374 | 3,769 | 653 | 4,106 | 74 | 4,602 | 0.4 | 5,649 | 4,844 | 5,588 | 656 | 1,014 | 924 | 278 |
| Seeds (ct) | - | - | - | 2 | - | - | - | - | - | 1 | 1 | - | - | - | 47 | - |

[1] Shell equals adjusted weight (100% of 1/2" material and four times a 25% sample of the 1/4" and 1/8" material).

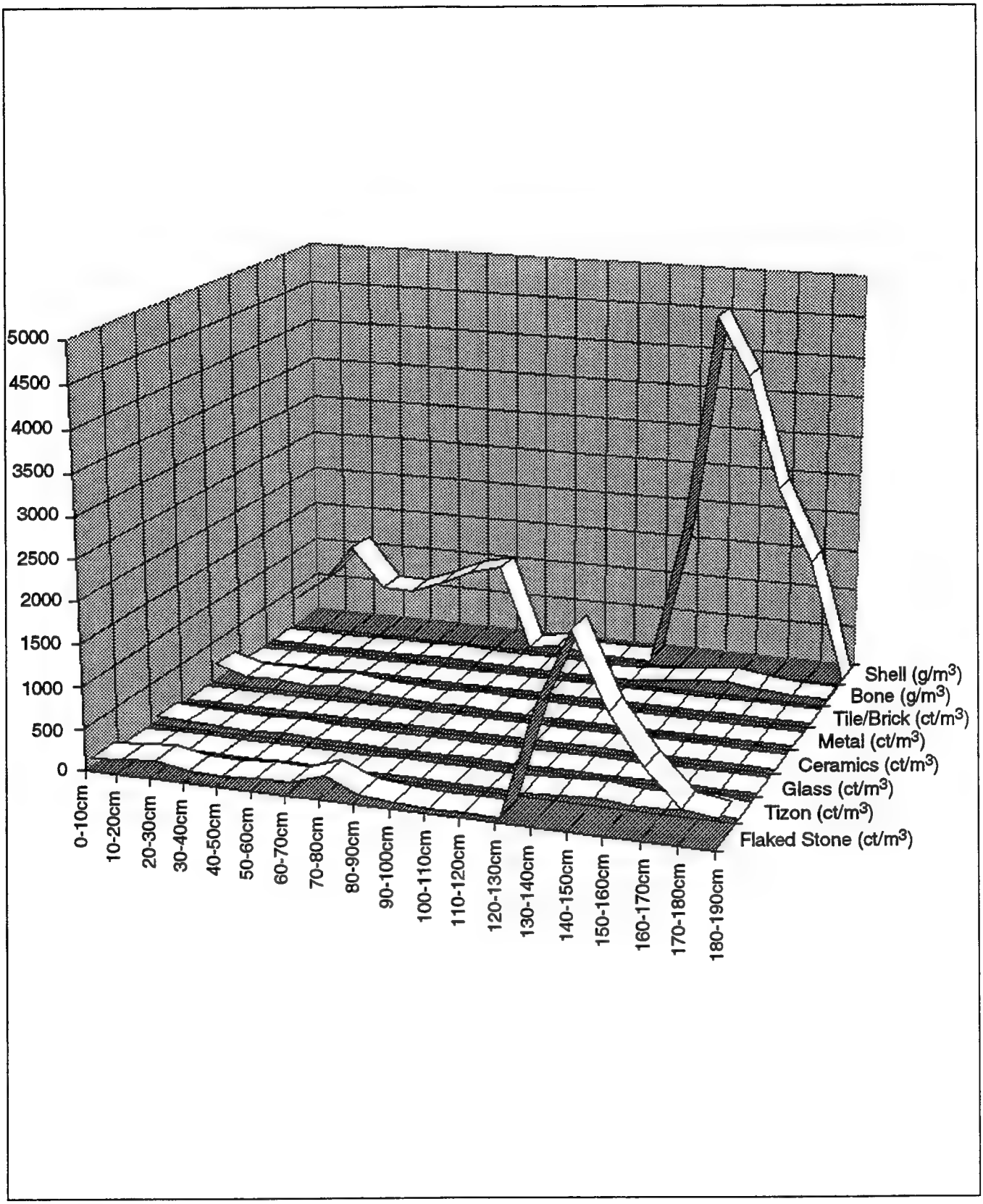



**Figure 5-9. Locus C Vertical Densities**

*Prehistoric Artifacts*

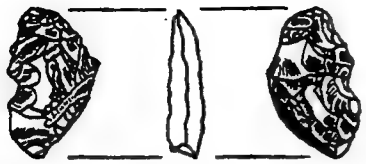
Prehistoric artifacts were recovered from all excavation units, to a maximum depth of 190 cm below surface. The recovered prehistoric assemblage consists of 19 flaked stone tools, 2,439 pieces of debitage, 7 fragments of groundstone, 84 pieces of Tizon Brownware, and 3 examples of worked shell (Tables 5-3 and 5-11).

**Flaked Stone Tools**: Nineteen flaked stone tools were recovered from Locus C, fifteen of which were recovered from the buried cultural component defined in Units 19, 19a, and 19b. Recovered tools include seven projectile points, seven bifaces, three possibly utilized flakes, and two modified flaked cobbles (Table 5-12). The two points (Catalog # 1331 and 2097; Figure 5-10) are similar to the Cottonwood triangular series. None of the other fragments are considered temporally diagnostic, although they are reflective of a Late Archaic assemblage. The majority of the flaked stone tools were composed of chert and quartz as well as a small portion of volcanic and granitic material (Tables 5-12 and 5-13).

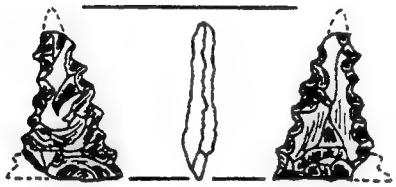
**Table 5-12. Distribution of Flaked Stone Tools from Locus C**

| *Catalog #* | *Provenience* | *Artifact* | *Material* | *Weight (g)* |
|---|---|---|---|---|
| 2339 | Unit 10, 20-30cm | Possible utilized flake | Chert | 34.6 |
| 2055 | Unit 17, 40-50cm | Biface fragment (mid-section) | Quartz | 2.1 |
| 1876 | Unit 19, 130-140cm | Biface fragment (base) | Quartz | 1.6 |
| 1767 | Unit 19, 130-140cm | Biface fragment (incomplete) | Chert | 0.6 |
| 2009 | Unit 19, 130-140cm | Biface fragment (mid-section) | Chert | 1.2 |
| 2499 | Unit 19, 140-150cm | Biface fragment (mid-section) | Chert | 6.9 |
| 1837 | Unit 19, 140-150cm | Biface fragment (mid-section) | Chert | 0.8 |
| 1505 | Unit 19, 140-150cm | Projectile point fragment (tip) | Quartz | 0.2 |
| 1863 | Unit 19, 140-150cm | Projectile point fragment (tip) | Chert | 0.2 |
| 1862 | Unit 19, 160-170cm | Projectile point fragment (tip) | Chert | 0.1 |
| 1032 | Unit 19a, 140-150cm | Biface fragment (base) | Chert | 1.7 |
| 2500 | Unit 19a, 140-150cm | Possible utilized flake | Volcanic | 19.4 |
| 1331 | Unit 19b, 140-150cm | Projectile point (mostly complete) | Quartz | 1.2 |
| 2311 | Unit 19b, 140-150cm | Projectile point fragment (tip) | Chert | 0.2 |
| 2206 | Unit 19b, 140-150cm | Flaked cobble with asphaltum | Granitic | 365.1 |
| 2502 | Unit 19b, 150-160cm | Possible utilized flake | Volcanic | 70.0 |
| 2004 | Unit 19b, 160-170cm | Projectile point (complete) | Chert | 0.3 |
| 2097 | Unit 27, 10-20cm | Projectile point (serrated, mostly complete) | Chert | 0.9 |
| 2224 | Unit 27, 20-30cm | Battered flaked cobble | Granitic | 98.7 |

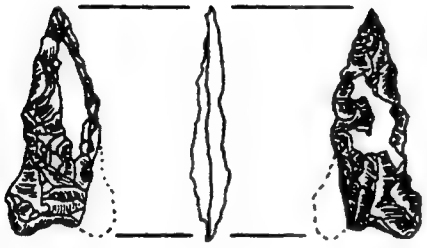
**Debitage**: Locus C had the second highest density of debitage (313 flakes/$m^3$) for the entire site. The horizontal and vertical distributions of debitage assemblage match well with those from the flaked stone tool assemblage (Table 5-11). The majority of the debitage was composed of volcanic material, chert, and quartz (Table 5-13).



Quartz Projectile Point Fragment
Unit 35, 50–60cm below surface
Catalog #2310
Locus D



Serrated Chert Projectile Point
Unit 27, 10–20cm below surface
Catalog #2097
Locus C



Quartz Projectile Point
Unit 19b, 140–150cm below surface
Catalog #1331
Locus C

**Figure 5-10. Projectile Points from Locus C and D**

**Table 5-13. Locus C Flaked Stone by Material Type**

| *Material* | *Debitage* | *Flakes with Cortex* | *Flaked Stone Tools* | *Average Flake Thickness* |
|---|---|---|---|---|
| Volcanic | 30.1% | 85.7% | 10.5% | 5.6 |
| Chert | 49.4% | 11.9% | 57.9% | 1.9 |
| Quartz | 19.5% | 2.4% | 21.1% | 8.1 |
| Other | 1.1% | - | 21.1% | - |

The large number of projectile points and bifaces manufactured from chert and quartz, along with the low recovery of chert or quartz flakes with cortex indicates that the initial stages of production of these tools were conducted off-site. Unlike volcanics, chert and quartz were not immediately available in the nearby stream beds; however, there is a major source of chert approximately 7 km to the northeast. Lithic materials from the Piedra de Lumbre (PDL) formation have been recovered from prehistoric sites recorded throughout the study area and would have been assessable to people living at SDI-812/H. Source locations for non-PDL chert and quartz are unknown.

Based on the radiocarbon dates (Table 5-2), at some point in time after the occupation reflected in Units 19, 19a, and 19b, the use of chert and quartz decreases. This shift may be attributed to the changes in basic subsistence patterns associated with the mission system. Production of small, finely flaked projectile points may no longer have been necessary.

**Groundstone**: Seven pieces of groundstone were recovered from Locus C, five of which came from Units 19, 19a, and 19b. Five pieces were considered mano fragments because of overall shape, although they exhibited limited wear pattern and little to no edge definition. No examples of pestles or metates were recovered from this area.

**Tizon Brownware:** Eighty-four pieces of Tizon were recovered from all but two units (11 and 18) to a maximum depth of 180 cm (Table 5-11). Over forty percent of the Tizon Brownware fragments were recovered from the deeply buried cultural deposits recovered Units 19, 19a, and 19b. When comparing the sherds from the deep deposit (Unit 19, 19a, 19b) with the rest of the locus assemblage, examination failed to document any difference in temper, sherd thickness, coloration, or firing techniques.

**Miscellaneous Artifacts**: One abalone pendant and two *Olivella* beads were recovered from the buried component of Locus C. The abalone pendant (Catalog # 627) was recovered from Unit 19a, 150-160 cm. The pendant is roughly rectangular in shape (Figure 5-11), measuring 31.4 mm in length, 12.4 mm in width along the center, and 3.75 mm in thickness. The circular perforation ranges from 2.5mm to 3.2mm in diameter.

An *Olivella biplicata* shell bead (Catalog # 3148) was recovered from Unit 19 between 140 and 150 cm below the surface. The artifact is characteristic of an *Olivella* Cylinder bead, according to Gibson's (1992) descriptions. The diameter of the bead is approximately 3.3 mm with a thickness ranging from 1.7 mm to 2.0 mm. The diameter of the conical perforation ranges from 1.4 mm on the dorsal side to 2.0 on the ventral side. The dorsal surface appears to have been ground smooth.

Abalone Pendant
Unit19A, 150-160 cm BS
Catalog No. 627

**Figure 5-11. Abalone Pendant from Locus C**

This type of bead is generally diagnostic of Phase 2 of the Late Period (ca. A.D. 1500-1782) for the Santa Barbara Channel region (Gibson 1992; King 1990).

A spire-lopped *Olivella* bead (Catalog # 3147) was recovered from Unit 19 at 130-140 cm. The *Olivella* bead is composed of a whole, small *Olivella biplicata* shell with the spire removed in a perpendicular fashion. It is approximately 4.9 mm at its maximum diameter, 8.4 mm in length, and has a 1.3 mm hole diameter. This type of bead is fairly common throughout the California cultural sequence (Gibson 1992; King 1990), and is not a very useful temporal marker.

*Historic Artifacts*

Historic artifacts recovered from Locus C include 183 pieces of glass, 558 metal fragments, one piece of tile or fired brick, and one glass trade bead (Tables 5-3 and 5-11). No historic ceramics were recovered in this locus. Unlike Loci A and B, the majority of the historic material was recovered from the top 0-20 cm levels. No historic glass, metal, ceramics, or tile/brick were recovered from the deeply buried cultural deposit represented by Units 19, 19a, and 19b.

**Glass**: The majority of the glass fragments were recovered from Unit 10 (Table 5-11), much of which dates between the late nineteenth and mid-twentieth centuries. The presence of clear glass and soda bottle fragments suggests that the earliest deposition date for this unit would be 1920s or later.

**Ceramics**: No historic ceramics were recovered from Locus C.

**Metal**: Out of the 558 pieces of metal recovered from Locus C, only 32 fragments could be assigned to a functional category. These artifacts include can fragments, two bolts, a square nail (pre-1890s), a washer, and 26 nails (post-1890s).

**Tile/Brick:** Only one fragment of low-fired tile or brick was recovered from the 1/2-inch screened material of Locus C. The low density of tile, brick, and other construction-related material from Locus C probably reflects the lack of historic architecture in this area of the site.

**Miscellaneous Historic Artifacts:** One globular, yellowish glass trade bead (Catalog # 628) was recovered from Unit 28, 40-50 cm. The bead measured 6.6 mm in diameter, with a center-drilled hole for stringing.

*Faunal and Floral Remains*

**Vertebrae Remains:** Over three thousand bone fragments weighing 145.4 grams (Tables 5-3 and 5-11) were recovered from Locus C. Identification and analysis of 732 of these fragments revealed evidence of a dramatic shift in subsistence patterns at the site over time. Unlike Loci A and B, unidentified small mammals dominate bone recovered from Locus C. Cattle or other domesticates were not recovered nor were there evidence of metal butchery or cut marks. Locus C ranked third in terms of overall site density of bone per cubic meter (400.1 fragments/$m^3$ or 18.6 g/$m^3$). The most common group of mammals was cottontail and jackrabbits. The dominance of rabbits and other small mammals is indicative of a prehistoric rather than contact period (Hudson et al. 1995, 1996). Faunal materials recovered from Units 19, 19a, and 19b are consistent with the suggested pre-contact subsistence pattern; no cattle or deer were represented in the three units. Furthermore, the low density of recovered faunal remains may indicate that this area was occupied briefly relative to other areas of the site.

**Invertebrate Remains:** Locus C ranked fourth among the loci in terms of shellfish recovery (Table 5-4). *Donax gouldii* was the dominant species by weight (81 percent), with trace amounts of the seven other taxa present in the identified assemblage. Dense concentrations of shell were noted in Units 15, 17, 19, 19a, and 19b. Units 15 and 17 were excavated in the uppermost A horizon, which appears to represent limited Native American use during the historic period. Low densities of all other artifact classes from Units 15 and 17, particularly bone and debitage, suggest that these shell concentrations are reflective of brief episodes of non-residential activity. Units 19, 19a, and 19b, which contain the highest density of shell from the locus, probably reflects a prehistoric subsistence base. It is interesting to note that no species differentiation was identified between the probable historic and prehistoric components.

**Macrobotanical Remains:** Macrobotanical remains from Locus C were more diverse than those from any other locus, with two amorphous fragments from Unit 13, a probable *Prunus* seed fragment from Unit 19, an unknown seed from Unit 19a, and 47 fragments of *Haplopappus* (cf. *H. Squarrous*) from Unit 28. Seeds from Unit 28 were considered historic, if not modern. If the seeds were historic, they could represent remains of a Luiseño house roofed with *Haplopappus*. See Section 8.0 for more details.

## Chronology

Radiocarbon results were obtained from nine shell samples. As shown in Table 5-2, temporal differences between Unit 19 and the other units are evident. Unit 19 dates as early as A.D. 1475 while the rest of Locus C dates between A.D. 1660 and 1950 (based on 2-sigma calibrated range). This difference reflects a vertical time difference of roughly 185 years. Material collected from Unit 19, 19a, and 19b clearly represents a buried prehistoric deposit, characterized by higher densities of lithic artifacts, rabbit and other small game, marine shell, and Tizon Brownware.

### Locus C Summary

Locus C yielded the second highest density of flaked stone tools, debitage, Tizon Brownware, and macrobotanical remains for the overall site. Two distinct deposits were identified, an upper (0-70 cm) stratum containing limited densities of prehistoric and historic materials and a buried component (identified in Units 19, 19a, 19b) with predominantly prehistoric artifacts. Units in the buried component securely date to the Late Prehistoric/Protohistoric Period while the upper stratum appears to date to Protohistoric and Historic times.

Important distinctions were noted between the upper stratum deposits (Units 10-18, 26-28, 32) and the buried component (Units 19, 19a, 19b). For example, the buried component was characterized by small mammals, particularly rabbits, and contained no examples of domesticated species. The buried component also contained fairly high concentrations of flaked stone, shell, and Tizon Brownware, but no historic glass, metal, ceramics, or tile/brick. In addition, Units 19, 19a, and 19b contained higher densities of chert and quartz than any other area of the site.

At some point in time after the occupation reflected in Units 19, 19a, and 19b, the use of chert and quartz decreases and the hunting of small mammals becomes less important. This shift may be attributed to the changes in basic subsistence patterns associated with the mission system. Production of small, finely flaked projectile points may no longer have been necessary. Further testing in the buried component and comparisons with other mission related sites would be required to address this issue in more detail.

## 5.7 LOCUS D

### Locus Structure

Four units (35, 36, 37, and 38) were excavated in an area measuring 28,502 $m^2$ to a maximum depth of 110 cm (Figure 5-12, Table 4-1). This portion of the site is located on an alluvial fan. Locus integrity is generally good, although fluvial and mechanical processes have affected some areas. Based on stratigraphic profiles, both Units 35 and 37 exhibit various degrees of disturbance. Both surficial and buried deposits exhibit good stratigraphic integrity except in the eastern part of the locus near Piedra de Lumbre Creek. In this area, fluvial action and mechanical disturbance may have mixed the deposits to a depth of 1 to 2 m.

### Recovery of Cultural Materials

Prehistoric and historic material was recovered from four excavation units (Table 5-14). The vertical distribution of cultural material of Locus D is provided in Figure 5-13.

#### *Prehistoric Artifacts*

Two flaked stone tools, 240 pieces of debitage, and four fragments of Tizon Brownware were recovered from Locus D (Tables 5-3 and 5-14).

**Flake Stone Tools**: Two flake stone tools were recovered from Locus D: a possible utilized chert flake from Unit 38, 30-40 cm (Catalog # 1971) and a quartz projectile point tip (Figure 5-10) from Unit 35, 50-60 cm (Catalog # 2310).

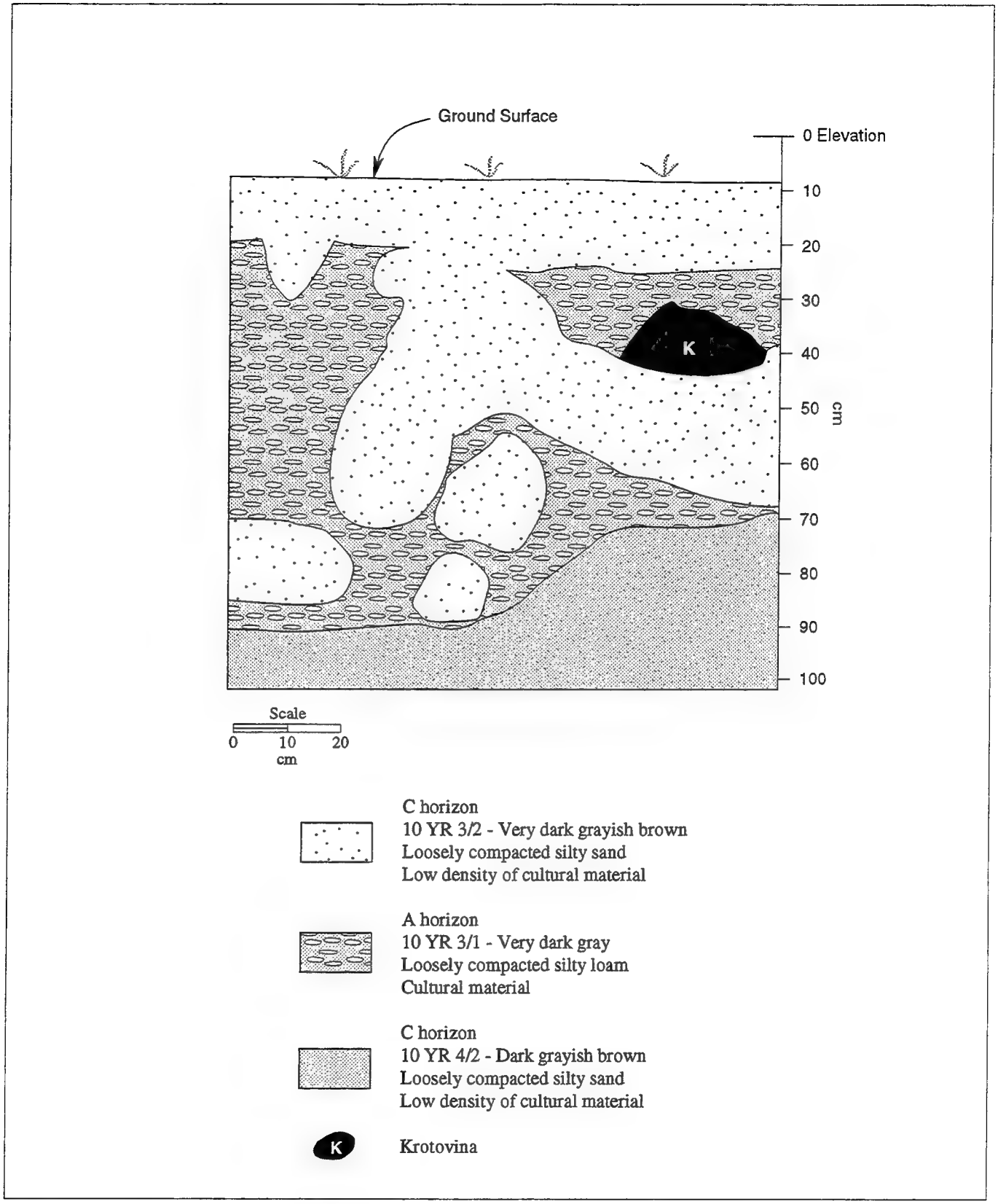



**Figure 5-12. North Wall Profile of Unit 36 from Locus D**

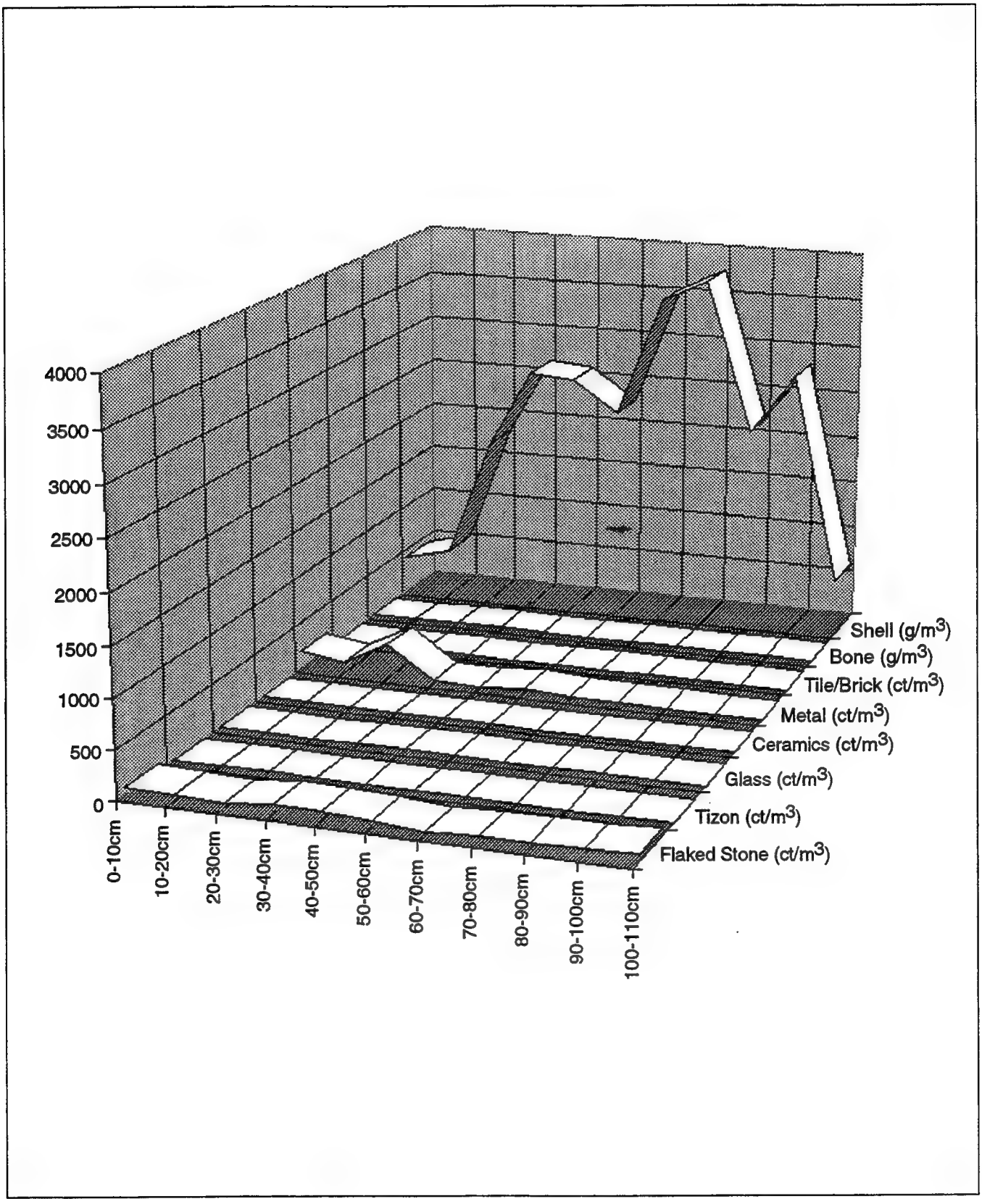



**Figure 5-13. Locus D Vertical Densities**

**Table 5-14. Locus D Cultural Material by Unit**

| | *Unit 35* | *Unit 36* | *Unit 37* | *Unit 38* |
|---|---|---|---|---|
| **Excavated Volume ($m^3$)** | 1.0 | 1.0 | 1.1 | 0.6 |
| **Prehistoric Artifacts** | | | | |
| Flake Stone Tools (ct) | 1 | - | - | 1 |
| Debitage (ct) | 48 | 109 | 63 | 20 |
| Groundstone (ct) | - | - | - | - |
| Tizon (ct) | - | - | - | 4 |
| Worked Shell (ct) | - | - | - | - |
| FAR (g) | 118 | 9 | 181 | - |
| **Historic Artifacts** | | | | |
| Glass (ct) | 8 | 7 | 8 | 4 |
| Ceramics (ct) | - | - | - | 2 |
| Metal (ct) | 209 | 60 | 23 | 30 |
| Tile/Brick (ct) | - | - | 1 | - |
| **Faunal & Floral** | | | | |
| Bone (g) | 10 | 9 | 12 | 3 |
| Shell (g)[1] | 17,847 | 232 | 12,810 | 328 |
| Seeds (ct) | - | 1 | 2 | - |

[1] Shell equals adjusted weight (100% of 1/2" material and four times a 25% sample of the 1/4" and 1/8" material).

**Debitage**: The overall density of debitage from Locus D (64.9 flakes/$m^3$) represents only the fourth highest for the entire site. Chert and quartz dominate the flaked stone assemblage (Table 5-15), which is similar to the high recovery rate of chert and quartz from the buried prehistoric component (Units 19, 19a, 19b) of Locus C. There was limited evidence of lithic maintenance activities (i.e., retouch) from the four Locus D units. The vertical recovery of debitage appears to be bimodal (Figure 5-13), with increased recovery at 30-60 cm (Units 35, 36 and 38) and between 80-100 cm (Unit 37). The lower vertical distribution from Unit 37 may be reflective of a buried paleo deposit.

**Table 5-15. Locus D Flaked Stone by Material Type**

| *Material* | *Debitage* | *Flakes with Cortex* | *Flaked Stone Tools* | *Average Flake Thickness* |
|---|---|---|---|---|
| Volcanic | 13.3% | 90.0% | - | 8.4 |
| Chert | 37.1% | - | 50.0% | 2.3 |
| Quartz | 42.7% | 10.0% | 50.0% | 6.3 |
| Other | 6.9% | - | - | - |

**Groundstone:** No groundstone was recovered from Locus D.

**Tizon Brownware:** Four sherds of Tizon Brownware were recovered from Unit 38 between 0 and 30 cm in depth. All of the sherds were extremely small and had few notable traits.

**Miscellaneous Artifacts:** No additional prehistoric artifacts were recovered from Locus D.

*Historic Artifacts*

Historic materials recovered from Locus D were limited to small fragments of glass, ceramics, metal, and low-fire tile. None of the historic materials were considered temporally or functionally diagnostic.

**Glass:** Twenty-seven fragments of glass were recovered from Locus D. All but one of the glass sherds was clear in color. Clear glass is usually associated with modern or post-1940s medicinal, liquor, or food containers.

**Ceramics:** Only two non-Tizon Brownware ceramic sherds were recovered from Locus D, and both appear to be remnants of a recent vessel.

**Metal:** Locus D yielded the second highest density of metal fragments for the entire site (Table 5-4). Although 322 pieces of metal were recovered, only nine were identifiable. These pieces consisted of a wire nail, can fragments, metal strapping, a 16-gauge brass shell, lead foil, and a square nail. All of the identified metal was recovered in the top 30 cm of the cultural strata. The fragmentation and general deterioration of the fragments in the lower levels may be reflective of site disturbance rather than original deposition.

**Tile/Brick:** One possible brick fragment was recovered from Unit 37 (60-70 cm level). The low density of tile, brick, and other construction-related material from Locus D probably reflects the lack of historic architecture in this area of the site.

**Miscellaneous Historic Artifacts:** No trade beads or other miscellaneous artifacts were recovered from Locus D.

*Faunal and Floral Remains*

**Vertebrate Remains:** Locus D produced one of the lowest densities of animal bone for the entire site (Table 5-4). As with Locus C, small mammals, such as gophers and rabbits, dominated the assemblage. In addition, seven large mammal elements were identified, including two pieces of deer. No domestic animals were present in the assemblage.

**Invertebrate Remains:** Approximately 31,000 g of shell were recovered from Locus D, yielding the site's highest density of invertebrate remains (Table 5-4). Most of the shell was recovered from Units 35 and 37. As with the other site areas, *Donax gouldii* was the dominant species identified by both weight and count (MNI).

**Macrobotanical Remains:** Three seeds were recovered from Locus D, one Poaceae fragment resembling *Triticum* from Unit 36 and two possible *Triticum* seeds from Unit 37. The genus

*Triticum*, or wheat, is a member of the grass family. It is considered to be an introduced plant and, therefore, representative of historic cultivation at the site. See Section 8.0 for more details.

### Chronology

Two shell samples from Unit 38 were submitted for radiocarbon dating and resulted in a calibrated 2-sigma range of A.D. 1620-1950 and a calibrated 2-sigma range of A.D. 1580-1950 (Table 5-2).

### Locus D Summary

Locus D yielded the highest density of shell for the entire site, but relatively low densities of other material types. The prehistoric component was dominated by chert and quartz, the shell was predominantly *Donax gouldii* remains, and the animal bone assemblage represented mainly small mammals. The historic artifacts were fairly undiagnostic, although the recovery of metal and glass fragments to depths of 100 cm reflects possible post-depositional disturbance. Radiocarbon dating suggests that the excavated portions of the Locus D represent a slightly earlier occupation than those present in Loci A, B, or the upper component of C, but a later occupation than the buried component of Locus C (Units 19, 19a, 19b). In addition, trenching work in Locus D suggests that a buried surface may be present east of Unit 37 (Figures 5-1 and 5-2); however, no buried components were located during unit excavations.

## 5.8 LOCUS E

### Locus Structure

Locus E is located in the northeastern portion of the site, at the base of an alluvial fan at an elevation of 23-26 m (75 to 85 feet) amsl. Locus E covers an area roughly 49,404 $m^2$. Integrity for this area ranges from poor to excellent, depending on location. Some, but not all, of the areas near Las Pulgas Road are severely disturbed down to 40-70 cm and exhibit a mixing of fluvial sands and blocks of A horizon material, suggesting that this area has been affected by mechanical ripping and/or rolling in of broken soil mixed with unaltered alluvium. Selected areas along Las Pulgas Road, however, have not been impacted. Only three units were excavated in Locus E, including Units 22, 23 (Figure 5-14), and 24. Based on soil profiles, Unit 24 is the only one believed to contain intact cultural deposits.

### Recovery of Cultural Materials

Low densities of prehistoric and historic material were recovered from the three excavation units in Locus E (Tables 5-3, 5-4, and 5-16). The vertical distribution of cultural materials is displayed graphically in Figure 5-15. Please note that the top 60 cm of the units were mechanically excavated with a backhoe in order to remove the disturbed overburden. Units were then excavated by hand down to a maximum depth of 120 cm below surface.

#### *Prehistoric Artifacts*

The prehistoric assemblage for this area was limited to 34 pieces of debitage and three Tizon Brownware sherds (Tables 5-3 and 5-16).

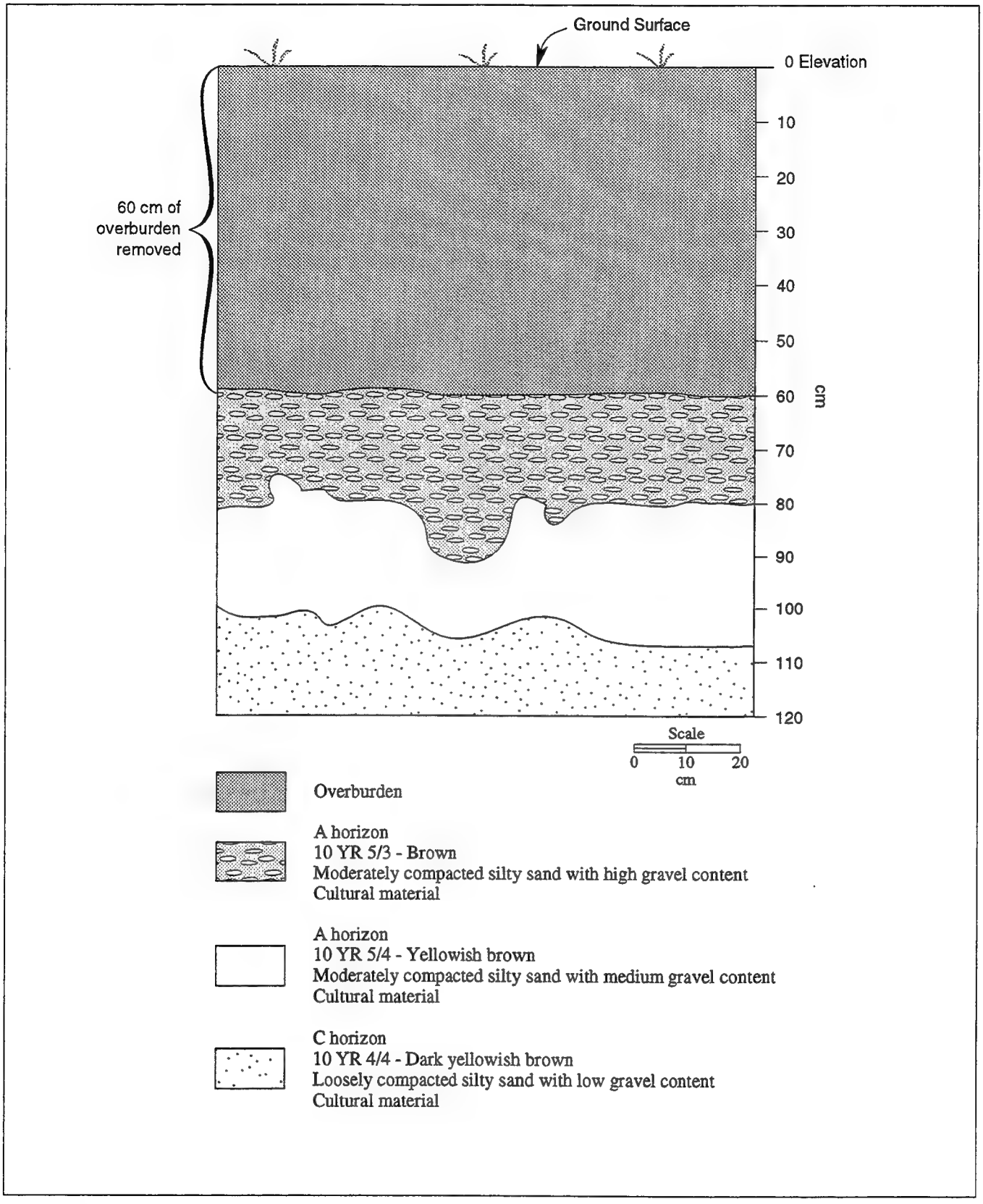



**Figure 5-14. North Wall Profile of Unit 23 from Locus E**

**Table 5-16. Locus E Cultural Material by Unit**

| | *Unit 22* | *Unit 23* | *Unit 24* |
|---|---|---|---|
| **Excavated Volume ($m^3$)** | 0.4 | 0.7 | 0.3 |
| **Prehistoric Artifacts** | | | |
| Flake Stone Tools (ct) | - | - | - |
| Debitage (ct) | 18 | 5 | 11 |
| Groundstone (ct) | - | - | - |
| Tizon (ct) | 1 | - | 2 |
| Worked Shell (ct) | - | - | - |
| FAR (g) | 106 | 17 | - |
| **Historic Artifacts** | | | |
| Glass (ct) | 3 | 17 | 5 |
| Ceramics (ct) | - | - | - |
| Metal (ct) | 4 | 2 | 2 |
| Tile/Brick (ct) | - | - | - |
| **Faunal & Floral** | | | |
| Bone (g) | 2 | 3 | 1 |
| Shell (g)[1] | 650 | 875 | 165 |
| Seeds (ct) | - | - | 259 |

[1] Shell equals adjusted weight (100% of 1/2" material and four times a 25% sample of the 1/4" and 1/8" material).

**Flaked Stone Tools:** No flaked stone tools were recovered from Locus E.

**Debitage:** Thirty-two pieces of debitage, composed primarily of quartz, volcanics, and chert, were recovered from Locus E (Table 5-17). The debitage is reflective of tool modification and maintenance, rather than tool manufacture. The high percentage of non-cortical quartz in this limited assemblage may suggest that a quartz projectile point or other type of biface was retouched in this area.

**Table 5-17. Locus E Flaked Stone by Material Type**

| *Material* | *Debitage* | *Flakes with Cortex* | *Flaked Stone Tools* | *Average Flake Thickness* |
|---|---|---|---|---|
| Volcanic | 37.8% | 100.0% | - | 6.1 |
| Chert | 18.9% | - | - | 1.6 |
| Quartz | 43.2% | - | - | - |
| Other | 7.1% | - | - | - |

**Groundstone:** No groundstone was recovered from Locus E.

**Tizon Brownware:** Three fragments of Tizon Brownware, two from Unit 24 and one from Unit 22, were recovered from Locus E. All of the sherds were small and had few notable traits.

**Miscellaneous Artifacts:** No miscellaneous prehistoric items, such as worked shell or steatite, were recovered from Locus E.

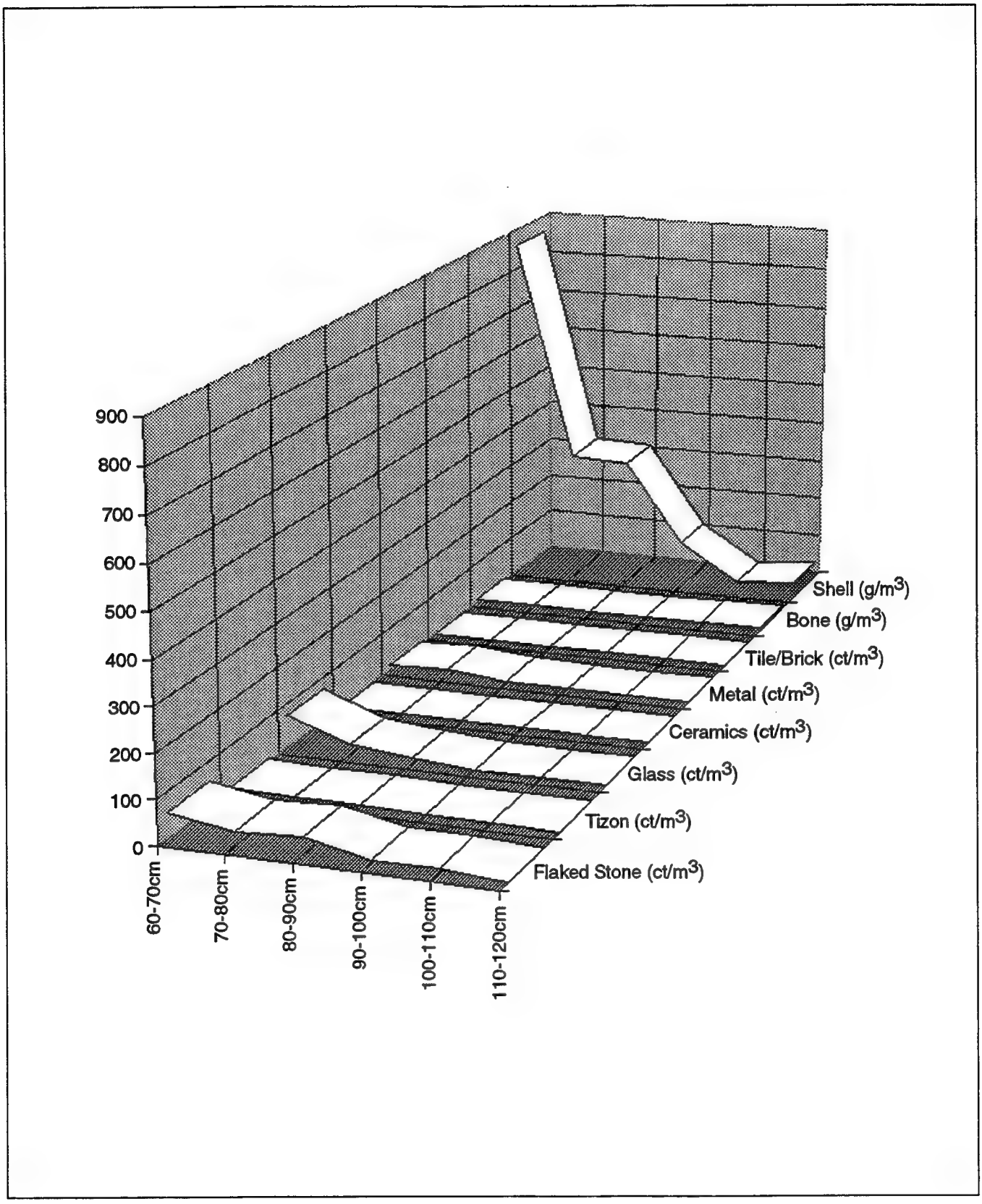



**Figure 5-15. Locus E Vertical Densities**

*Historical Artifacts*

Historic artifacts were limited to a few fragments of glass and metal (Tables 5-3 and 5-16) recovered from between 60 and 90 cm below the surface. The recovery of metal and glass artifacts suggests some type of post-depositional disturbance.

**Glass:** Twenty-five glass fragments were collected from the three excavated units. Glass colors included olive-green, amber, clear, and quartz.

**Ceramics:** No historic ceramics were collected from Locus E.

**Metal:** The assemblage from Locus E represents the lowest density of metal remains for the entire site (Table 5-4). Only eight fragments were recovered from the three excavation units, none of which could by classified by function or time period.

**Tile/Brick:** No fragments of tile, brick, or other construction-related materials were recovered from Locus E, which may reflect the lack of historic architecture in this area of the site.

**Miscellaneous Historic Artifacts:** No trade beads or other miscellaneous artifacts were recovered from Locus E.

*Faunal and Floral Remains*

**Vertebrate Remains:** Locus E contained the fewest bone specimens and the least diverse assemblage for the entire site. Small mammals appear to dominate the collection, although one fragment (0.67 g) from a large mammal was also recovered. No domestic animal elements were identified.

**Invertebrate Remains:** Locus E yielded the lowest density of shell from the site. Only three different taxa of shell were identified, including *Donax gouldii, Tivela stultorum,* and undifferentiated Chiton. *Donax* comprised 91 percent of the identifiable shell by weight and 99.7 percent by minimal number of individual counts. A slightly higher concentration of shell was recovered from Units 22 and 23, and these deposits may be the result of post-depositional rather than cultural activities.

**Macrobotanical Remains:** Over 250 seeds were recovered from Unit 24, by far the highest density of seed recovery for the site (Table 5-4). These seeds include several genus of Poaceae (grass family) as well as a single *Rumex* (sorrel) fragment. These taxa are known to have been used ethnohistorically by the Luiseño, and potentially represent prehistoric site use. See Section 8.0 for more details.

Chronology

A single radiocarbon date was obtained from Unit 24 (90-100 cm), a 2-sigma calibrated date of A.D. 1705-1950. None of the recovered artifacts were considered temporally sensitive.

### Locus E Summary

Locus E contained the lowest density of both prehistoric and historic artifacts for the entire site (Table 5-4). A unimodal, vertical distribution of cultural material was found for the three units. None of the artifacts collected were considered temporally sensitive or reflective of a distinct behavior. Although Unit 24 was defined as containing intact cultural deposits, discrete differences in the vertical distribution of the assemblage or in the composition of material types were not found between Units 22, 23, and 24. The unusual aspect of Locus E is the recovery of high densities of macrobotanical remains from the lower levels of Unit 24.

# 6 VERTEBRATE FAUNAL ANALYSIS

## 6.1 INTRODUCTION

A variety of vertebrate skeletal remains including fish, reptiles, birds, and mammals have been recovered from SDI-812/H, the Rancho Las Flores Adobe and Las Flores *Estancia* Adobe ruins and associated Loci, on Camp Pendleton Marine Corps Base, San Diego County, California. The following analysis is based on a representative sample (100 percent of the 1/2-inch screen sample, and 25 percent each of the 1/4-inch and 1/8-inch screen samples) of the vertebrate faunal remains recovered from 38 excavation units. The sample was examined and analyzed by the UCLA Zooarchaeology Laboratory. The fish remains were identified and analyzed by Brenda Bowser of SAIC and Robert Lavenberg of the Natural History Museum of Los Angeles County.

## 6.2 RESEARCH QUESTIONS

A number of research questions can be addressed in the analysis of the sample of this large faunal assemblage. With the definition of a temporally distinct deposit in three of the 1 m x 1 m test units excavated at SDI-812/H (Units 19, 19a, and 19b in Locus C), some of the research questions presented by this site can be addressed in a chronometric framework. Where the cultural levels in different units are temporally comparable, various issues such as site function, resource focus, and duration of occupation can be addressed, on a deposit by deposit basis. With 38 excavation units spread across the site and its 5 primary loci, considerable information is available regarding spatial patterning of the cultural deposits during the Historic period, and possibly during Late Prehistory as well. Where radiocarbon dates reach back the farthest (Units 19, 19a, and 19b), information allowing comparison of Historic and Late Prehistoric period diets and possible shifts and purposeful continuity in certain subsistence patterns is available and will be addressed. Evidence of butchery practices and other modification is discussed, as is the potential for differential access to potentially higher ranked resources such as cattle.

## 6.3 HISTORICAL BACKGROUND

The utility of ethnohistoric or ethnographic data in defining the role of coastal environments in this region, during even the protohistoric and historic periods, is limited, primarily due to the effects of Franciscan missions established in this region during the 1780s (Bean and Shipek 1978; Hudson et al. 1996; True 1966). At the time of European contact, the Camp Pendleton region was inhabited by the Juaneño to the north and the Luiseño to the south and interior (Bean and Shipek 1978). A number of early Spanish chroniclers recorded Luiseño Indians living in the Las Flores Valley (Brigandi 1995; Rivers 1991; Schaefer 1992). The Las Flores Valley has at least 3 Late Prehistoric or

Protohistoric village names associated with it; *Chumelle*, *Quesinille*, and *Huisme* (Brigandi 1995; Rivers 1991; Schaefer 1992).

Missionization resulted in the concentration of many local Native Californian populations under the control of Spanish padres in their *dormitorios* or outlying settlements, resulting in virtual abandonment of much of the coast in the region (True 1966). However, in some areas, notably in the vicinity of Mission San Luis Rey, the policy of Padre Peyri encouraged the maintenance of indigenous settlement patterns. Las Flores was just such a place. According to historical records, Native Californians continued to reside at Las Flores throughout the mission period, acting as ranch hands and laborers, and attending the occasional liturgical services held in the *Estancia*'s chapel (Brigandi 1995; Rivers 1991; Schaefer 1992).

With the advent of secularization in 1834, many Juaneño and Luiseño were forced off their lands and fled to the interior (Bean and Shipek 1978). As a result, perhaps, the majority of available ethnohistorical records focus on discussion of interior groups, with little or no mention of coastal habitation. Las Flores, however, was a brief exception to this general trend. The Las Flores *Estancia* was deeded to the indigenous Luiseño inhabitants in 1835 as a *Pueblo Libre*, one of only a dozen or so in *Alta California* (Brigandi 1995). The *Pueblo Libre* of Las Flores suffered continuous pressure and threat of takeover by the powerful Pico family until 1844, when the local Luiseño signed their land rights away. Subsequent to the Pico's takeover, many of the original indigenous inhabitant moved elsewhere (Brigandi 1995; Rivers 1991; Schaefer 1992). Despite the historic upheaval endured by these people, many cultural traditions have remained strong (Bean and Shipek 1978).

## 6.4 METHODS

The vertebrate faunal remains discussed here are interpreted independently, as one site, and by Locus (A-E). Units 19, 19a, and 19b are also treated as a separate sub-area of the overall site for comparative purposes, since it is suspected, based on calibrated radiocarbon dates, that this area represents a buried Late Prehistoric period site. In so doing, the data from the site as a whole, and individual Loci of SDI-812/H, can be described and interpreted as separate manifestations, and compared to one another to afford a broader perspective of the general area.

The total quantity of bone recovered from the thirty-eight excavation units at SDI-812/H is 23,305 fragments weighing 2,636.2 g. The UCLA Zooarchaeology Laboratory received a 100 percent sample of the faunal remains recovered from the 12 mm (1/2-inch) collection, a 25 percent sample of the 6 mm (1/4-inch) screened material, and a 25 percent sample of the 3 mm (1/8-inch) screened material. The total sample of non-fish vertebrate faunal remains analyzed by UCLA consists of 5,591 fragments of bone weighing 1,018.20 g. In addition, 63 fragments of non-otolith fish bone were analyzed by Brenda Bowser (SAIC), and 20 otolith fragments were identified by Robert Lavenberg (Natural History Museum of Los Angeles County).

The non-fish vertebrate remains were identified by the staff of the UCLA Zooarchaeology laboratory including Mercedes Duque, Lady Harrington, Judith Porcasi, Elsie Sandefur, and Thomas Wake. All identifications were confirmed using the comparative osteological collection housed in the UCLA Institute of Archaeology Zooarchaeology Laboratory. Each bone specimen was identified to the most discrete taxonomic level possible. More detailed taxonomic assignment

is limited to elements with sufficient distinguishing features allowing rapid identification to the given level.

Bones lacking discrete diagnostic features were sorted into broad size categories by class, or as representative of the Vertebrata. Size categories are defined as follows: for mammals, large represents deer size or greater, medium represents smaller than deer but larger than jackrabbit, and small represents jackrabbit or smaller; for birds large represents goose size or greater, medium represents ducks to jays, and small represents robin or smaller. All faunal remains identifiable as fish were separated, bagged with appropriate provenience tags, and returned to Brenda Bowser of SAIC for identification and analysis.

For each discretely identifiable bone, a series of data were recorded including catalog number, complete provenience and screen size information, skeletal element, part of element, side, age, and modification. Data recorded regarding modification of bone specimens includes evidence of burning, cut marks, gnaw marks, and tool or other artifact manufacture. The bone was counted and weighed to the nearest 0.01 g using Ohaus electronic scales. Complete detailed information is provided in the accompanying catalog (Appendix B).

All fish remains were identified in detail by taxon and element. Taxonomic identifications of sixty-three fragments of non-otolith bone were made by Brenda Bowser with reference to the comparative skeletal collections of fishes at the Department of Anthropology, University of California, Santa Barbara. The identification focused on vertebrae (atlas and other) and mouth parts (teeth, pharyngeal, dentaries, and premaxillaries). These elements are the most frequently occurring fish bones identifiable by taxon and most useful in calculating minimum numbers of individuals (MNI). Following taxonomic identification, the fish bones were recorded according to provenience, screen size, taxon, element, symmetry (side of body), fragmentation, presence or absence of burning (charring or calcination), other modification such as cut marks, count, and weight. In addition, twenty otoliths were identified by Robert Lavenberg using comparative collections housed at the Natural History Museum of Los Angeles County.

## 6.5 RESULTS

A total of 5,591 individual non-fish vertebrate skeletal elements, weighing 1,018.20 grams are identified from SDI-812/H. The non-fish vertebrate assemblage is represented by 21 mutually exclusive taxa (Tables 6-1 and 6-2). A subtotal of 1,109 elements was only identifiable as Vertebrata and is not considered in finer grained analysis. Reptiles and amphibians provided 7 (0.15 percent, exclusive of Vertebrata) identified elements, and Birds provided 22 (0.48 percent, exclusive of Vertebrata) identified elements (Table 6-3). The only discretely identified reptile or amphibian taxon is the western pond turtle (*Clemmys marmorata*, n=3). The only discretely identified bird taxon is the mallard (*Anas platyrhynchos*) from Locus B. The majority of the bird remains are found in 2 loci, A (n=6), and B (n=12). Only 4 bird elements are present in the other 3 loci, 1 in Locus C, and 3 in Locus D. No birds are present in Locus E.

Mammal remains dominate this assemblage, providing 4,453 identified specimens (exclusive of the Vertebrata category), or 97.55 percent of the identified elements at the site (Table 6-3). Sixteen mammal genera and 13 species are represented in the mammal assemblage. The most common identified mammal species is the pocket gopher (*Thomomys bottae*, n=96), followed by cattle (*Bos taurus*, n=22). Rabbit (desert cottontail, *Sylvilagus auduboni*, n=17; and jackrabbit, *Lepus californicus*,

**Table 6-1. Non-Fish Vertebrate Taxa**

- **REPTILIA**
  - Order Salientia (Frogs and Toads)
  - Order Squamata (Snakes)
    - **Colubridae** (Colubrid Snakes)
  - Order Testudines (Turtles)
    - **Emydidae** (Box and Water Turtles)
      - *Clemmys marmorata* (Western Pond Turtle)
- **AVES**
  - Order Anseriformes (Waterfowl)
    - **Anatidae** (Swans, Geese, Ducks)
      - *Anas platyrhynchos* (Mallard Duck)
    - **Anserinae** (Goose subfamily)
- **MAMMALIA**
  - Order Artiodactyla (Even-toed Hoofed Mammal)
    - **Bovidae** (Sheep, Goats, and Cattle)
      - *Bos taurus* (Cattle)
      - *Ovis aries* (Sheep)
    - **Cervidae** (Deer)
      - *Odocoileus hemionus* (Mule Deer)
    - **Sulidae** (Pigs)
      - *Sus scrofa* (Pig)
  - Order Carnivora (Carnivore)
    - **Canidae** (Dogs and Foxes)
      - *Canis* sp. (Dog or Coyote)
  - Order Lagomorpha (Rabbits, Hares, and Pikas)
    - **Leporidae** (Rabbits and Hares)
      - *Lepus californicus* (Blacktail Jackrabbit)
      - *Sylvilagus auduboni* (Desert Cottontail)
  - Order Rodentia (Gnawing Mammals)
    - **Arvicolodae** (Voles)
      - *Microtus californicus* (California Vole)
    - **Cricetidae** (Deer Mice and Wood Rats)
      - *Onychomys torridus* (Southern Grasshopper Mouse)
      - *Peromyscus trueii* (Piñon Mouse)
    - **Geomyidae** (Pocket Gophers)
      - *Thomomys bottae* (Southern Pocket Gopher)
    - **Heteromyidae** (Kangaroo Rats, Kangaroo Mice, and Pocket Mice)
      - *Dipodomys* sp. (Kangaroo Rat)
      - *Perognathus californicus* (California Pocket Mouse)
    - **Muridae** (Old World Rats and Mice)
      - *Mus musculus* (House Mouse)
    - **Sciuridae** (Squirrels)
      - *Ammosphermophilus leucurua* (Whitetail Antelope Squirrel)
      - *Spermophilus beecheyi* (California Ground Squirrel)

**Table 6-2. Identified Non-Fish Vertebrate Taxa From SDI-812/H**

| *Taxon* | *Common Name* | *Count* | *Weight (g)* |
|---|---|---|---|
| **Reptilia** | | | |
| Salientia | Frogs & Toad Order | 1 | 0.01 |
| Colubridae | Snake, Non-venomous | 3 | 0.06 |
| *Clemmys marmorata* | Turtle, Western pond | 3 | 0.15 |
| **Aves** | | | |
| Aves | Bird, Unid. | 7 | 0.29 |
| Aves, lg | Bird, large | 3 | 2.51 |
| Aves, md | Bird, medium | 5 | 0.52 |
| Aves, sm | Bird, small | 5 | 0.06 |
| *Anas platyrhynchos* | Duck, mallard | 1 | 0.03 |
| Anserinae | Goose subfamily | 1 | 1.01 |
| **Mammalia** | | | |
| Mammalia, lg | Large mammal, Unid. | 1,080 | 637.10 |
| Mammalia, med | Medium mammal, Unid. | 9 | 0.52 |
| Carnivora, sm | Small carnivore | 1 | 0.08 |
| Mammalia, sm | Small mammal, Unid. | 574 | 37.52 |
| Mammalia | Mammal, Unid. | 2,367 | 129.78 |
| Artiodactyla | Hoofed mammal, even-toed | 131 | 33.74 |
| *Bos taurus* | Cattle | 22 | 83.77 |
| *Ovis aries* | Sheep, domestic | 4 | 13.38 |
| *Odocoileus hemionus* | Deer, mule | 6 | 7.29 |
| *Sus scrofa* | Pig | 1 | 0.11 |
| Carnivora | Carnivore | 4 | 0.90 |
| *Canis* sp. | Dog or coyote | 3 | 1.25 |
| *Lepus californicus* | Hare, blacktailed jackrabbit | 17 | 5.76 |
| *Sylvilagus auduboni* | Rabbit, desert cottontail | 17 | 1.37 |
| *Sylvilagus* sp. | Rabbit | 22 | 1.71 |
| Leporidae | Hare/Rabbit | 18 | 0.74 |
| Rodentia, sm | Rodent, small | 11 | 0.25 |
| Rodentia | Rodent | 19 | 0.54 |
| *Microtus californicus* | Vole, California | 18 | 0.52 |
| *Onychomys torridus* | Mouse, southern grasshopper | 5 | 0.08 |
| *Peromyscus trueii* | Mouse, pinon | 1 | 0.03 |
| *Peromyscus* sp. | Mouse, white-footed | 4 | 0.10 |
| Cricetidae | Mice/Rats/Voles - New World | 2 | 0.02 |
| *Thomomys bottae* | Gopher, valley pocket | 96 | 6.40 |
| *Dipodomys* sp. | Rat, kangaroo | 1 | 0.08 |
| *Perognathus californicus* | Mouse, California pocket | 2 | 0.02 |
| *Perognathus* sp. | Mouse, pocket | 1 | 0.01 |
| *Mus musculus* | Mouse, house | 2 | 0.02 |
| *Spermophilus beecheyi* | Squirrel, California ground | 14 | 1.39 |
| *Ammosphermophilus leucurus* | Squirrel, whitetail antelope | 1 | 0.02 |
| **Vertebrata** | Vertebrate, Unid. | 1,109 | 49.06 |
| **Total** | | **5,591** | **1,018.20** |

**Table 6-3. Percentage of Major Vertebrate Class by Locus (by count)**

| *Taxon* | *A (%)* | *B (%)* | *C (%)* | *D (%)* | *E (%)* | *Total (ct)* | *Total (%)* |
|---|---|---|---|---|---|---|---|
| Reptiles | 0.06 | 0 | 0.56 | 1.31 | 0 | 7 | 0.15 |
| Birds | 0.17 | 4.96 | 0.19 | 1.96 | 0 | 22 | 0.48 |
| Mammals | 99.14 | 92.56 | 91.62 | 88.24 | 100.00 | 4,453 | 97.55 |
| Fish | 0.64 | 2.48 | 7.64 | 8.50 | 0 | 83 | 1.82 |

*Note: Percentages exclude Undifferentiated Vertebrates*

n=17), and rodent (California vole, *Microtus californicus*, n=18; and California ground squirrel, *Spermophilus beecheyi*, n=14) species are also well represented.

For the site as a whole (all 5 loci) large mammal remains (including more discretely identified species) dominate by weight (775.39 g), and come in second numerically to unidentified mammals (n=2367, 129.78 g, unidentified mammal; n=1244, 775.39 g, large mammal). A total of 826 small mammal remains weighing 56.66 g are also identified. Medium mammals comprise 2.67 g (n=16), only a small portion of the mammal sample.

Among the dominant large mammal category, the only discretely identified taxa (to Order, but preferably Family or better) are artiodactyls (n=164, 138.29 g). The artiodactyl taxa identified to species include cattle (n=22, 83.77 g), mule deer (*Odocoileus hemionus*, n=6, 7.29 g), sheep (*Ovis aries*, n=4, 13.38 g), and pig (*Sus scrofa*, n=1, 0.11g). The only identified mammal species more numerous than cattle at this site are gophers (n=96). Interestingly, cattle are found only in loci A and B. Of the 4,453 mammal elements, only 2 cattle ribs from Locus B, and 4 large mammal scraps (Locus C=3, Locus B=1) bear cut marks.

Most of the thick walled bone scraps and splinters identified only as large mammal probably come from cattle, but it is nearly impossible to be certain, since the elements in question are so highly fragmented. The high frequency of fragmentation in general at this site could be passed off as merely post depositional taphonomic effects. It is possible, however, that some of this fragmentation, at least in the large mammal, could be purposeful, perhaps the result of attempts to obtain the large amounts of marrow found in artiodactyl bones.

Fish provided eighty-three (1.82 percent, exclusive of Vertebrata) identified elements (Table 6-3). Nine mutually exclusive fish taxa, including Jacksmelt (*Atherinopsis californiensis*), Pacific Sardine (*Sardinops sagax*), Yellowtail (*Seriola lalandi*), Surfperch (Embiotocidae), Señorita (*Oxyjulis californica*), California Sheephead (*Semicossyphus pulcher*), White Croaker (*Genyonemus lineatus*), Pacific Mackerel (*Scomber japonicus*), and Bat Ray (*Myliobatis californica*), were identified on the basis of non-otolith fish bone from SDI-812/H (Table 6-4). Five additional species, including California Corbina (*Menticirrhus undulatus*), Queenfish (*Seriphus politus*), California Barracuda (*Sphyraena argentea*), Greenstriped Rockfish (*Sebastes elongatus*), and Olive Rockfish (*Sebastes serranoides*), were identified from the otolith assemblage. Of the sixty-three non-otolith specimens, forty were identified to the level of family, genus, or species. Twelve specimens (approximately 20 percent) exhibit evidence of burning or calcination. Except for burning, no cut marks or other

**Table 6-4. Fish Taxa**

TELEOSTEI
- Order Atheriniformes
  - **Atherinidae** (Silversides)
    - *Atherinopsis californiensis* (Jacksmelt)
- Order Clupeiformes
  - **Clupeidae** (Herrings)
    - *Sardinops sagax* (Pacific Sardine)
- Order Perciformes
  - **Carangidae** (Jacks, Amberjacks, Pompanos)
    - *Seriola lalandi* (Yellowtail)
  - **Embiotocidae** (Surfperch)
  - **Labridae** (Wrasses)
    - *Oxyjulis californica* (Señorita)
    - *Semicossyphus pulcher* (California Sheephead)
  - **Sciaenidae** (Croakers)
    - *Genyonemus lineatus* (White Croaker)
    - *Menticirrhus undulatus* (California Corbina)
    - *Seriphus politus* (Queenfish)
  - **Scombridae** (Mackerels and Tunas)
    - *Scomber japonicus* (Pacific Mackerel)
  - **Sphyraenidae**
    - *Sphyraena argentea* (California Barracuda)
- Order Scorpaeniformes
  - **Scorpaenidae** (Scorpionfishes and Rockfishes)
    - *Sebastes elongatus* (Greenstriped Rockfish)
    - *Sebastes serranoides* (Olive Rockfish)

ELASMOBRANCHII
- Order Myliobatidiformes
  - **Myliobatididae** (Eagle Rays)
    - *Myliobatis californica* (Bat Ray)

evidence of modification were observed. Differences in taxonomic richness and the specific fish taxa represented across the different spatial and temporal components of the site are attributable to the relatively low numbers of individual specimens (NISP) recovered.

### Locus A

The overall pattern described above becomes quite different when the individual loci are treated separately (Table 6-5). Locus A was by far the most productive area in terms of vertebrate faunal remains, producing a total of 4,368 elements weighing 848.33 g from 12 excavation units. Examination of the total density of bone from Locus A (352.0g/$m^3$) confirms that this locus contains a much higher concentration of bone than any other loci (Table 5-4). Locus A also produced the most taxonomically diverse array of mammals of any of the SDI-812/H Loci.

**Table 6-5. Identified Non-Fish Vertebrate Taxa by Locus**

| Taxon | A (ct) | A (g) | B (ct) | B (g) | C (ct) | C (g) | D (ct) | D (g) | E (ct) | E (g) | Total Count | Total Weight |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Reptilia** | | | | | | | | | | | | |
| Salientia | - | - | - | - | - | - | 1 | 0.01 | - | - | 1 | 0.01 |
| Colubridae | 1 | 0.01 | - | - | 1 | 0.01 | 1 | 0.04 | - | - | 3 | 0.06 |
| *Clemmys marmorata* | 1 | 0.05 | - | - | 2 | 0.10 | - | - | - | - | 3 | 0.15 |
| **Aves** | | | | | | | | | | | | |
| Aves, unid | - | - | 7 | 0.29 | - | - | - | - | - | - | 7 | 0.29 |
| Aves, lg | 1 | 0.20 | 2 | 2.31 | - | - | - | - | - | - | 3 | 2.51 |
| Aves, md | 3 | 0.27 | 1 | 0.12 | - | - | 1 | 0.13 | - | - | 5 | 0.52 |
| Aves, sm | 1 | 0.01 | 1 | 0.01 | 1 | 0.02 | 2 | 0.02 | - | - | 5 | 0.06 |
| *Anas platyrhynchos* | - | - | 1 | 0.03 | - | - | - | - | - | - | 1 | 0.03 |
| Anserinae | 1 | 1.01 | - | - | - | - | - | - | - | - | 1 | 1.01 |
| **Mammalia** | | | | | | | | | | | | |
| Mammalia, lg | 1,002 | 583.94 | 37 | 24.93 | 35 | 26.51 | 5 | 1.05 | 1 | 0.67 | 1,080 | 637.10 |
| Mammalia, md | 2 | 0.17 | 7 | 0.35 | - | - | - | - | - | - | 9 | 0.52 |
| Carnivora, | - | - | - | - | - | - | - | - | 1 | 0.08 | 1 | 0.08 |
| Mammalia, sm | 132 | 7.22 | 62 | 2.19 | 286 | 25.34 | 81 | 2.44 | 13 | 0.33 | 574 | 37.52 |
| Mammalia, unid | 2,229 | 121.18 | 59 | 5.06 | 78 | 3.53 | - | - | 1 | 0.01 | 2,367 | 129.78 |
| Artiodactyla | 128 | 32.99 | 2 | 0.71 | 1 | 0.04 | - | - | - | - | 131 | 33.74 |
| *Bos taurus* | 18 | 47.22 | 4 | 36.55 | - | - | - | - | - | - | 22 | 83.77 |
| *Ovis aries* | 1 | 8.06 | 3 | 5.32 | - | - | - | - | - | - | 4 | 13.38 |
| *Odocoileus hemionus* | 2 | 1.25 | 1 | 2.00 | 1 | 0.18 | 2 | 3.86 | - | - | 6 | 7.29 |
| *Sus scrofa* | 1 | 0.11 | - | - | - | - | - | - | - | - | 1 | 0.11 |
| Carnivora | 4 | 0.90 | - | - | - | - | - | - | - | - | 4 | 0.90 |
| *Canis* sp. | 3 | 1.25 | - | - | - | - | - | - | - | - | 3 | 1.25 |
| *Lepus californicus* | 1 | 0.07 | 2 | 4.13 | 12 | 1.41 | 1 | 0.08 | 1 | 0.07 | 17 | 5.76 |
| *Sylvilagus auduboni* | 3 | 0.33 | 1 | 0.02 | 12 | 0.94 | 1 | 0.08 | - | - | 17 | 1.37 |
| *Sylvilagus* sp. | - | - | 10 | 0.56 | 9 | 0.63 | 3 | 0.52 | - | - | 22 | 1.71 |
| Leporidae | 3 | 0.14 | 3 | 0.15 | 10 | 0.38 | 1 | 0.04 | 1 | 0.03 | 18 | 0.74 |
| Rodentia, sm | 2 | 0.02 | - | - | 3 | 0.10 | 6 | 0.13 | - | - | 11 | 0.25 |
| Rodentia | 4 | 0.06 | 5 | 0.08 | 6 | 0.25 | 2 | 0.08 | 2 | 0.07 | 19 | 0.54 |
| *Microtus californicus* | 8 | 0.28 | 7 | 0.15 | 2 | 0.07 | 1 | 0.02 | - | - | 18 | 0.52 |
| *Onychomys torridus* | 3 | 0.03 | 2 | 0.05 | - | - | - | - | - | - | 5 | 0.08 |
| *Peromyscus trueii* | 1 | 0.03 | - | - | - | - | - | - | - | - | 1 | 0.03 |

**Table 6-5. Identified Non-Fish Vertebrate Taxa by Locus**

| Taxon | A (ct) | A (g) | B (ct) | B (g) | C (ct) | C (g) | D (ct) | D (g) | E (ct) | E (g) | Total Count | Total Weight |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Mammalia (cont.)** | | | | | | | | | | | | |
| *Peromyscus* sp. | - | - | 2 | 0.06 | 1 | 0.02 | 1 | 0.02 | - | - | 4 | 0.10 |
| Cricetidae | - | - | 2 | 0.02 | - | - | - | - | - | - | 2 | 0.02 |
| *Thomomys bottae* | 26 | 1.22 | 11 | 1.21 | 31 | 1.25 | 28 | 2.72 | - | - | 96 | 6.40 |
| *Dipodomys* sp. | 1 | 0.08 | - | - | - | - | - | - | - | - | 1 | 0.08 |
| *Perognathus californicus* | 2 | 0.02 | - | - | - | - | - | - | - | - | 2 | 0.02 |
| *Perognathus* sp. | - | - | - | - | 1 | 0.01 | - | - | - | - | 1 | 0.01 |
| *Mus musculus* | 1 | 0.01 | - | - | 1 | 0.01 | - | - | - | - | 2 | 0.02 |
| *Spermophilus beecheyi* | 3 | 0.44 | 4 | 0.30 | 3 | 0.46 | 2 | 0.12 | 2 | 0.07 | 14 | 1.39 |
| *Ammospermophilus leucurus* | - | - | - | - | - | - | 1 | 0.02 | - | - | 1 | 0.02 |
| **Vertebrata** | 780 | 39.76 | 65 | 2.31 | 236 | 6.28 | 19 | 0.50 | 9 | 0.21 | 1,109 | 49.06 |
| **Total Non-Fish Assemblage** | 4,368 | 848.33 | 301 | 88.91 | 732 | 67.54 | 159 | 11.88 | 31 | 1.54 | 5,591 | 1,018.20 |

However, most of the identified mammal taxa in Locus A are represented by less than 10 identified elements, usually less than 5. This indicates that the large sample size from locus A, compared to the other loci, may be primarily responsible for its relatively higher species diversity (e.g. Grayson 1984).

This sub-assemblage is dominated by fragmented mammal and large mammal elements (n=3,231, 705.12g). Only six bird elements and two reptile elements are present. Also, very few rabbit elements (n=7, 0.54 g) are present. The more discretely identified large mammal taxa include artiodactyls (n=128, 32.99 g), cattle (n=18, 47.22 g), deer (n=2, 1.25 g), sheep (n=1, 8.06 g) and pig (n=1, 0.11g). The only other identified mammal taxon present in substantial numbers are gophers (n=26, 1.22g). No evidence of butchery or processing is apparent.

Seven mutually exclusive fish taxa were identified on the basis of non-otolith fish bone from Locus A. Of 17 specimens, eleven were identified to the level of family, genus, or species including Jacksmelt, Pacific Mackerel, Señorita, California Sheephead, members of the surfperch family, White Croaker, unidentified bony fishes (Teleosteii) and unidentified shark and/or ray (Elasmobranchii). In addition, five White Croaker otoliths and one possible Olive Rockfish otolith were identified from the Locus A collection.

**Locus B**

Locus B, like Locus A, is dominated by fragmented mammal and large mammal elements (n=96, 29.99 g). This area is also less diverse than Locus A, possibly due to sample size effects. Rabbits are more common here than they are in Locus A (n=16, 4.86 g). The most important mammals in Locus B are the artiodactyls (n=10, 44.58 g), with cattle dominant (n=4, 36.55 g), as with Locus A. Locus B produced the only identifiable skeletal elements bearing cut marks, two cow ribs with metal knife slices.

Locus B also produced the greatest number of bird remains of all the loci (n=12, 2.76 g), and the only identifiable bird species (one mallard element). No reptile or amphibian remains were recovered from Locus B. This area was the second most productive locus in terms of overall density by weight (110.3g/$m^3$) due largely to the cattle remains. This locus is comparatively rich in faunal remains, however, since only 4 excavation units were opened.

Two mutually exclusive fish taxa were identified on the basis of fish bone from Locus B. Of six specimens, three were identified to the level of family, genus, or species. The fish bone represents Pacific Mackerel, Señorita, and unidentified bony fish. No otoliths were recovered from Locus B.

**Locus C**

Locus C produced the second greatest number of bone specimens (n=472) due to the large number of excavation units (n=16), yet ranked sixth in term of density of bone per cubic meter (62/$m^3$). It was the third heaviest in terms of weight (18.6 g/$m^3$). Locus C, as a whole, is quite different than loci A and B. This area is dominated numerically by unidentified small mammals (n=171, 22.39 g). The small mammals are separated by only 0.35 g from the slightly heavier 22 large mammal elements. No cattle are identified from Locus C, although 1 deer element (0.18 g) is present. The most common group of mammals are rabbits (n=26, 2.39 g). Cottontails and jackrabbits are almost

equally common in number (10 and 11 respectively) and relatively close in weight (1.24 g vs. 0.89 g). The most common identified mammal species in Locus C is gopher (n=25, 1.09 g).

One small bird element is identified. None of the skeletal elements from Locus C bear any butchery or processing marks. The dominance of rabbits and other small mammals in Locus C deposit, in comparison to Loci A and B, has a much more "prehistoric" look to it (see Hudson et al 1995, 1996 for comparison). The low density of faunal remains from Locus C may indicate that this area was occupied briefly relative to occupation of other areas of the site.

One fish taxon was identified on the basis of fish bone from the historic component of Locus C. A single Pacific Mackerel vertebra was recovered. Pacific Mackerel is a schooling fish that can be netted or captured by hook and line year-round in open surface water nearshore.

Units 19, 19a, and 19b of Locus C contain a buried cultural component, roughly 130 cm to 180 cm below the surface. Radiocarbon analysis suggests that this component dates to the Late Prehistoric/Protohistoric Period. The analyzed sample from these units produced 300 bone specimens weighing over 10.25 g (Table 6-6). All of the reptile remains present in Locus C are from the buried component in Units 19, 19a and 19b. Birds are not represented. Large mammals are represented by 8 (3.77 g) unidentifiable scraps. Of the 188 elements identified as mammal, 142 represent small mammals. Within the small mammals, rabbits are the best represented group with 17 elements weighing 0.97 g. The most common identified mammal taxon in these Units is, again, gopher (n=6, 0.16 g). No cattle or deer are represented. Faunal remains from these units lack domesticates, emphasize rabbits and other small game and are consistent with a pre-contact subsistence pattern (see Hudson et al. 1995, 1996 for comparison).

**Table 6-6. SDI-812/H Identified Taxa from Units 19, 19a, and 19b**

| *Taxon* | *Common Name* | *Count* | *Weight (g)* |
|---|---|---|---|
| **Reptilia** | | | |
| Colubridae | Snake, Non-venomous | 1 | 0.01 |
| *Clemmys marmorata* | Turtle, Western pond | 2 | 0.10 |
| **Mammalia** | | | |
| Mammalia, lg | Large mammal, Unidentified | 8 | 3.77 |
| Mammalia, sm | Small mammal, Unidentified | 115 | 2.95 |
| Mammalia | Mammal, Unidentified | 38 | 0.71 |
| *Lepus californicus* | Hare, blacktailed jackrabbit | 2 | 0.17 |
| *Sylvilagus auduboni* | Rabbit, desert cottontail | 1 | 0.05 |
| *Sylvilagus* sp. | Rabbit | 5 | 0.43 |
| Leporidae | Hare/Rabbit | 9 | 0.32 |
| Rodentia | Rodent | 4 | 0.08 |
| *Thomomys bottae* | Gopher, valley pocket | 6 | 0.16 |
| **Vertebrata** | Vertebrate, Unidentified | 69 | 1.50 |
| **Teleostei & Elasmobranchii** | Fish, Undifferentiated | 40 | - |

Seven mutually exclusive fish taxa were identified on the basis of non-otolith fish bone from the prehistoric component of Locus C (Units 19, 19a, 19b). Of 28 specimens, 15 were identified to the level of family, genus, or species. The fish bone represents herring (probably Pacific Sardine), Pacific Mackerel, Señorita, Surfperch, White Croaker, Yellowtail, unidentified bony fishes, and Bat

Ray. In addition, four White Croaker otoliths, two California Corbina otoliths, two California Barracuda otoliths, and four Rockfish otolith (two of which may be Greenstriped Rockfish) were identified from the prehistoric component.

**Locus D**

Locus D produced the second fewest number and third lowest weight of bone specimens (n=159, 11.88 g) from four excavation units. Locus D ranked fourth in terms of overall bone density (8.7 $g/m^3$). No domestic mammals are present, and only seven large mammal elements (4.91 g) are identified, 2 of which are deer (3.86 g). This locus produced the only frog or toad bone (0.01 g), 1 snake vertebra (0.04 g), and 3 bird elements (0.15 g).

Small mammals clearly dominate Locus D numerically (n=128) and by weight (6.27 g). Gophers are the most common small mammals (n=28, 2.72 g), with rabbits (n=5, 0.72 g) running second. This relatively small sample appears to fit prehistoric assemblage patterns much better than historic, in light of the dominance of small mammals, few large mammals, and no domesticates.

Three mutually exclusive fish taxa were identified on the basis of non-otolith fish bone from Locus D. Of eleven specimens, nine were identified to the level of family, genus, or species. These represent herring (probably Pacific Sardine), Pacific Mackerel, and Señorita. In addition, one White Croaker otolith and one Queenfish otolith were recovered from Locus D.

**Locus E**

Locus E produced the fewest bone specimens (n=31), and lightest (1.54 g) and least diverse (2 taxa identified to species, 8 categories total) assemblage overall. No reptiles, amphibians, or birds were recovered. Small mammals appear to dominate (n=20, 0.65 g). Only 1 (0.67 g) large mammal fragment was recovered. Other than the fact that no domesticated animal elements were identified, little can be said from such a small sample. Not surprisingly, bone densities from Locus E are low (3.9 $g/m^3$), suggesting that Locus E was occupied for the shortest duration of any of the other loci.

No fish remains were identified from the Locus E sample assemblage.

## 6.6 SUMMARY AND INTERPRETATIONS

SDI-812/H consists of 5 separate and distinct loci (A-E). Locus A surrounds the Las Flores *Estancia* ruins (established in 1823), and Locus B surrounds the later (1867) Las Flores Adobe Ranch House. Both of these loci are dominated by large mammal remains and are the most taxonomically diverse areas of the site. These two loci are also the only areas of the site to yield discretely identified remains of domesticated mammals (cattle, sheep and pigs). Butchered cattle bones (2 ribs) are found only within Locus B. It is possible that the occupants of Loci A and B controlled access to or preferential distribution of domestic animal products. Based on the faunal evidence and obvious historical context it is safe to say that Loci A and B date clearly to the historic period. Little firm faunal evidence of prehistoric occupation of these loci is discernible.

Loci C, D, and E, farther up Las Flores Canyon, differ from Loci A and B in a number of respects; no domesticated mammals are present, small mammals tend to dominate the assemblages, and they are generally less taxonomically rich. Based on the aforementioned criteria, these three loci fit

much more easily into a prehistoric faunal profile for the region which emphasizes small mammals and taxonomic diversity (Hudson et al. 1995, 1996).

This Late Prehistoric pattern is particularly evident in Units 19, 19a, and 19b in Locus C. These units are securely dated to the Late Prehistoric/Protohistoric Period. No domesticates and few large mammals are present, and small mammals--particularly rabbits--dominate.

While the prehistoric patterns discernible in Locus C, especially Units 19, 19a, and 19b, are apparent, the small sample sizes from Loci D and E severely limit interpretation. All that can be said of Loci D and E is that small mammals dominate and few large mammals and no domesticates are present.

As far as the fish assemblage is concerned, it is clear that the inhabitants of SDI-812/H exploited a variety of marine habitats. Habitat groups are defined below according to studies of marine biogeographers synthesized by de Martini (1969) and the U.S. Department of the Interior (MMS 1987), supplemented by Eschmeyer, Herald, and Hammann (1983), Follett (1976), and personal observations of habitat affiliations. Exploited habitats and associated fishes include:

- shallow rocky areas around kelp and other seaweeds (Señorita, Sheephead);
- shallow sandy or sand/mud bottom, including coastal waters and bays, sloughs, and estuaries (Bat Ray, White Croaker);
- undifferentiated nearshore (Jacksmelt, Surfperch);
- open surface waters in bays and close to nearshore kelpbeds, year-round (Pacific Mackerel, Pacific Sardine); and
- open surface waters nearshore in spring and summer, offshore in fall and winter (Yellowtail).

Considering the low numbers of individual specimens recovered from SDI-812/H, the relative importance of different habitats was not calculated.

The majority of fish could have been caught using hook and line and small nets such as dip nets or seines. Harpoons, spears, and traps also may have been used. Although some of the fishing may have been from the shore, some required the use of a small boat, such as a tule balsa. Fishing in offshore waters would have required a sturdier watercraft.

The single yellowtail vertebra from Locus C provides possible evidence for fishing in offshore waters during the fall or winter. Alternatively, the yellowtail may have been caught nearshore during the spring or summer. The remainder of fishes would have been available nearshore during any season of the year.

## 6.7 FUTURE RESEARCH QUESTIONS

A number of avenues of inquiry can be used to guide future research and analysis of vertebrate fauna from SDI-812/H. With the presence of a buried late prehistoric component in Locus C and other Late Prehistoric sites in Las Flores Canyon (Hudson et al. 1996), it may be possible to study contact period subsistence strategy shifts in the valley proper. Such questions as defining the importance of rabbits in the diet during the Late Prehistoric versus Early Historic Periods, and determining whether the introduction of cattle resulted in drop-offs of lower ranked indigenous

fauna (small mammals) or drop-offs of the higher ranked indigenous fauna (deer), or both, might be answered.

One interesting result of the current analysis concerns the distribution of domesticated animal bone at SDI-812/H. Apparently domesticates are found only in Loci A and B, in close proximity to the historic structures. Examination of the remaining vertebrate faunal assemblage can also confirm whether or not bones of domesticated animals are confined to Loci A and B, or spread more evenly across the site. With a larger sample size, it is also more likely that more bones showing evidence of butchery or processing will show up. An increased sample size will also allow a more detailed study of fragmentation patterns in the unidentifiable mammal size classes in order to determine whether the condition of the specimens is culturally related or post-depositional. Better inferences can then be made regarding meat consumption, distribution, and possibly social status of the inhabitants of various loci.

# 7 INVERTEBRATE FAUNAL ANALYSIS

Approximately 122,400 grams of shell were recovered during the excavation of thirty-eight test units at SDI-812/H (see Table 5-3). A 35-percent sample was selected for further identification and analysis based on screen sizes of 1/2-inch (100-percent sample), 1/4-inch (25-percent sample), and 1/8-inch (25-percent sample). This sample was collected from six analytical units at the site including Locus A (Units 4 and 9), Locus B (Units 31 and 33a), Locus C (Units 13, 28, and 32), Locus D (Units 37 and 38), Locus E (Units 23 and 24), and Unit 19 (although located in Locus C, archaeological materials from Unit 19 predate other materials collected from this locus).

## 7.1 METHODS

The shellfish assemblage was sorted to the finest taxonomic level possible using a comparative collection and various references including *The Audubon Society Field Guide to North American Seashells* (Rehder 1995), *A Field Guide to Pacific Coast Shells* (Morris 1980), and *Intertidal Invertebrates of California* (Morris et al. 1980). Specimens that could not be identified using the above sources were classified as either a bivalve or gastropod. Chitons and crustaceans were not differentiated by species. Identified taxa are listed in Table 7-1. A minimum number of individuals (MNI) value was calculated. For bivalves, MNI was calculated by counting the hinges and dividing by two. MNIs for *Donax gouldii*, however, were estimated based on formulas derived from the counts and weights of several hundred shells. MNIs for gastropods and crustaceans were based on actual counts since they were few in number. Shellfish densities from each analytical unit were adjusted for sample size.

Marine habitats represented by the shellfish collection are defined as follows: (1) Rocky shoreline, which consists of mud, sand, cobbles, shell fragments, or a mixture of these, associated with rock outcrops; (2) exposed non-rocky shoreline, which is the same as rocky shoreline but without large rock outcrops; (3) protected bays, which are composed of any combination of the above habitats; and (4) estuaries, which are composed of mostly sand and mud flats that may be exposed during low tides. Tidal ranges and zones (ASM Affiliates 1996) consist of an Upper Range (splash zone, upper intertidal, and middle intertidal) and Lower Range (lower intertidal and subtidal zones).

## 7.2 RESULTS

The analyzed invertebrate collection contains an estimated 24,176 minimum number of individuals with a total weight of 11,322.11 grams (Table 7-2). Fifteen mutually exclusive taxa are represented in the shellfish collection; however, the assemblage is clearly dominated by a single species, *Donax gouldii*, which contributed over 98 percent of the total shell. *Donax gouldii* is a burrowing mollusk that inhabits the upper tidal zone of sandy shores. Red Beach, located at the mouth of Las Flores

**Table 7-1. Invertebrate Taxa**

- **PHYLUM MOLLUSCA**
  - Class Gastropoda
    - **Haliotidae** (Abalones)
      - *Haliotis cracherodii* (Black Abalone)
      - *Haliotis rufescens* (Red Abalone)
    - **Olividae** (Olive Shells)
      - *Olivella biplicata* (Purple Olive)
    - **Trochidae** (Pearly Top Shells)
      - *Tegula funebralis* (Black Top; Black Turban)
  - Class Pelecypoda
    - **Cardiidae** (Cockles)
      - *Trachycardium quadragenarium* (Giant Pacific Cockle)
    - **Donacidae** (Bean Clams)
      - *Donax gouldii* (Little Bean Clam)
    - **Mytilidae** (Mussels)
      - *Mytilus* spp. (mussel)
      - *Septifer bifurcatus* (Platform Mussel)
    - **Pectinidae** (Scallops)
      - *Argopecten aequisulcaltus* (Speckled Scallop)
      - *Hinnites multirugosus* (Giant Rock Scallop)
    - **Veneridae** (Venus Clams)
      - *Chione* spp. (Venus)
      - *Protothaca staminea* (Pacific Littleneck)
      - *Tivela stultorum* (Pismo Clam)
  - Class Polyplacophora (Chiton)

- **PHYLUM ARTHROPODA**
  - Class Crustacea
    - Subclass Cirripedia (Barnacles)

Creek less than a kilometer downstream from the site, is one of the largest sandy beach habitats on Camp Pendleton. By weight, the remaining sample of identifiable shell consisted of *Mytilus* sp. (0.94 percent), *Tivela stultorum* (0.38 percent), and trace amounts of the other 12 taxa (Table 7-2).

Locus A yielded 3,183.72 g of analyzed shell represented by eleven mutually exclusive taxa (Table 7-3). Only 2.40 g was unidentifiable. *Donax gouldii* composed over 95 percent of the total shell by weight and 99 percent by MNI. The rest of the material was represented by *Mytilus* sp., *Protothaca staminea*, and trace amounts of the other taxa. The total density of shell for Locus A was 7,485.7 g/m$^3$ (see Table 5-4) the second highest concentration within the site. There is little variability in the vertical distribution of shellfish remains in Locus A. All units are characterized by unimodal distributions that indicate a single episode of occupation or multiple occupations over a relatively brief time. Horizontal variation within the locus is pronounced, however, with relatively high

**Table 7-2. Analyzed Invertebrate Assemblage from SDI-812/H**

| *Taxon* | *Habitat*[1] | *Tidal Range*[2] | *Faunal Type*[3] | *Weight (g)* | *Weight (%)* | *MNI (ct)* | *MNI (%)* |
|---|---|---|---|---|---|---|---|
| **Gastropoda** | | | | | | | |
| Gastropod, undif. | V | - | E | 0.11 | 0.001 | - | - |
| *Haliotis cracherodii* | R | B | E | 1.70 | 0.016 | 4 | 0.017 |
| *Haliotis rufescens* | R | B | E | 3.09 | 0.029 | 3 | 0.012 |
| *Haliotis* spp. | R | B | E | 0.40 | 0.004 | - | - |
| *Olivella biplicata* | N/B/E | L | E | 1.80 | 0.017 | 3 | 0.012 |
| *Tegula funebralis* | R | L | E | 0.78 | 0.007 | 4 | 0.017 |
| *Tegula* spp. | R | L | E | 0.19 | 0.002 | - | - |
| **Pelecypoda** | | | | | | | |
| *Trachycardium quadragenarium* | B | L | I | 2.10 | 0.019 | 1 | 0.004 |
| *Donax gouldii* | N | U | I | 10,619.60 | 98.485 | 24,057 | 99.508 |
| *Mytilus* spp. | R/B | L | E | 100.97 | 0.936 | 50 | 0.207 |
| *Septifer bifurcatus* | R/B | L | E | 0.29 | 0.003 | 2 | 0.008 |
| *Argopecten aequisulcatus* | B/E | U | I | 1.94 | 0.018 | 6 | 0.025 |
| *Hinnites multirugosus* | R | L | E | 0.20 | 0.002 | 1 | 0.004 |
| *Chione* spp. | B/E | L | I | 0.10 | 0.001 | 1 | 0.004 |
| *Protothaca staminea* | B/R | L | I | 5.46 | 0.051 | 12 | 0.050 |
| *Tivela stultorum* | N | B | I | 40.70 | 0.377 | 17 | 0.070 |
| **Other Invertebrates** | | | | | | | |
| Chiton, undif. | R | B | E | 3.44 | 0.032 | 14 | 0.058 |
| Barnacle, undif. | V | - | - | 0.05 | 0.000 | 1 | 0.004 |
| Shell, undif. | V | - | - | 539.19 | - | - | - |
| **Total** | | | | **11,322.11** | - | **24,176** | - |

1 Habitat: R = exposed rocky shores; N = exposed nonrocky shores; B = bays; E = estuaries; V = various habitats
2 Tidal Range: U = upper (includes middle zone); L = lower (includes subtidal zone); B = both upper and lower ranges
3 Faunal Type: E = epifauna (on rocks or other shells); I = infauna (burrowing)
*Note*: Percentages exclude undifferentiated shell.

densities of invertebrate remains noted in the vicinity of Units 1, 2 and 4 (see Table 5-5). These concentrations may indicate the presence of discrete activity areas or dump zones.

Locus B yielded 1,629.31 g of analyzed shell represented by three mutually exclusive taxa (Table 7-3). *Donax gouldii* comprised over 88 percent of the shell by weight and close to 100 percent of the identifiable MNI. *Argopecten aequisulcatus* and *Olivella biplicata* were the only other shell species identified from this locus. The low diversity of shellfish at this locus is notable. A relatively high proportion (187.30 g) of the collection was unidentifiable, presumably due to long-term, post-depositional disturbances from historic and modern activities (this heavily used area is currently part of a Boy Scout Camp). Locus B also exhibits a unimodal distribution of shellfish. Some concentration of shell is noted in Unit 31 (see Table 5-8). Additional testing in this locus would allow further definition and interpretation of variation in shell distribution.

**Table 7-3. Distribution of Analyzed Shellfish by Locus**

| *Taxon* | *A (g)* | *A (MNI)* | *B (g)* | *B (MNI)* | *C (g)* | *C (MNI)* | *D (g)* | *D (MNI)* | *E (g)* | *E (MNI)* | *Unit 19 (g)* | *Unit 19 (MNI)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Gastropoda** | | | | | | | | | | | | |
| Gastropod, undif. | – | – | – | – | 0.01 | – | 0.10 | – | – | – | – | – |
| *Haliotis cracherodii* | 1.40 | 2 | – | – | 0.20 | 1 | – | – | – | – | 0.10 | 1 |
| *Haliotis rufescens* | 3.00 | 2 | – | – | – | – | 0.09 | 1 | – | – | – | – |
| *Haliotis* spp. | 0.40 | – | – | – | – | – | – | – | – | – | – | – |
| *Olivella biplicata* | – | – | 0.90 | 1 | 0.50 | 1 | – | – | – | – | 0.40 | 1 |
| *Tegula funebralis* | 0.50 | 1 | – | – | 0.09 | 1 | 0.10 | 1 | – | – | 0.09 | 1 |
| *Tegula* spp. | 0.19 | – | – | – | – | – | – | – | – | – | – | – |
| **Pelecypoda** | | | | | | | | | | | | |
| *Trachycardium quadragenarium* | – | – | – | – | – | – | – | – | – | – | 2.10 | 1 |
| *Donax gouldii* | 3,072.50 | 8,085 | 1,441.10 | 3,014 | 1,229.70 | 2,272 | 3,279.40 | 7,695 | 257.60 | 830 | 1,339.30 | 2,161 |
| *Mytilus* spp. | 95.09 | 34 | – | – | 0.09 | 1 | 0.99 | 7 | – | – | 4.80 | 8 |
| *Septifer bifurcata* | 0.29 | 2 | – | – | – | – | – | – | – | – | – | – |
| *Argopecten aequisulcatus* | 0.28 | 3 | 0.01 | 1 | – | – | – | – | – | – | 1.65 | 2 |
| *Hinnites multirugosus* | – | – | – | – | 0.20 | 1 | – | – | – | – | – | – |
| *Chione* spp. | 0.10 | 1 | – | – | – | – | – | – | – | – | – | – |
| *Protothaca staminea* | 4.18 | 10 | – | – | – | – | 1.28 | 2 | – | – | – | – |
| *Tivela stultorum* | 2.80 | 3 | – | – | 1.60 | 3 | 8.40 | 5 | 9.00 | 1 | 18.90 | 5 |
| **Other Invertebrates** | | | | | | | | | | | | |
| Chiton, undif. | 0.59 | 4 | – | – | 2.00 | 1 | 0.70 | 4 | 0.10 | 1 | 0.05 | 4 |
| Barnacle, undif. | – | – | – | – | – | – | – | – | – | – | 0.05 | 1 |
| Shell, undif. | 2.40 | – | 187.30 | – | 276.00 | – | – | – | 15.19 | – | 58.29 | – |
| **Total** | 3,183.72 | 8,147 | 1,629.31 | 3,016 | 1,510.39 | 2,281 | 3,291.06 | 7,715 | 281.89 | 832 | 1425.73 | 2,185 |

A total of 1,510.39 g of shell were analyzed from Locus C (Units 19, 19a, 19b excluded), represented by eight mutually exclusive taxa. *Donax gouldii* comprised the largest portion of the collection by weight (81 percent) and by MNI (almost 100 percent). Only trace amounts of the seven other taxa were identified. Active military use of Locus C undoubtedly accounts for the large proportion (276.00 g) of undifferentiated shell in this part of the site. Locus C exhibits interesting spatial patterning with concentrations in the vicinity of Units 15, 17, and 19 (see Table 5-11). Units 15 and 17 were excavated in the uppermost A horizon, which appears to represent limited Native American activities during the historic period. Low densities of all other artifact classes from Units 15 and 17, particularly bone and debitage, suggests these shell concentrations reflect brief episodes of non-residential activity. In contrast, the high density of shell noted in Unit 19, considered a separate unit of analysis, is mirrored by similar concentrations of bone, lithics, pottery, and other artifacts. High densities and diversities of cultural material as well as radiocarbon dates suggest that Unit 19 reflects a relatively long duration of residential use by the protohistoric Luiseño (see below).

Locus D yielded a total of 3,291.06 g of analyzed shell represented by three mutually exclusive taxa. All shell was identifiable. *Donax gouldii* dominates the collection by weight (99.6 percent) and by MNI (99.7 percent). Intrasite patterning within Locus D is indicated by a rather high density of shell from Units 35 and 37 (see Table 5-14), although these may be redeposited material. Densities of metal and glass were relatively high throughout these units, and the interior surfaces of *Donax gouldii* shells from both units were packed with black soil rather than the light-colored silty sand matrix in which they were found. In addition, many shells still exhibited a pinkish color while most *Donax gouldii* from the site are white with age. Fluvial processes may also have affected this deposit. Redeposition and subsequent disturbance probably accounts for the multimodal vertical distribution of shell and other materials from these units.

Locus E yielded the least amount (281.89 g) of analyzed shell from the site. As with Locus B, only three mutually exclusive taxa of shell were identified: *Donax gouldii, Tivela stultorum,* and undifferentiated chiton. *Donax gouldii* comprised 91 percent of the identifiable shell by weight and 99.7 percent by MNI. Locus E exhibits slight concentrations of shell in Units 22 and 23 (see Table 5-16). Low densities of all other materials throughout Locus E suggest the low shell concentrations reflect brief episodes of non-residential activity. Metal and glass distributions throughout Locus E indicate post-depositional disturbance.

Unit 19, part of a small block exposure of a buried protohistoric component located in Locus C, yielded 1,425.73 g of analyzed shellfish. Only 4 percent of the collection was unidentifiable. This collection contains 10 mutually exclusive taxa of shellfish, second in number only to Locus A. Not surprisingly, 94 percent of the collection by weight and 99 percent of the collection by MNI was comprised of *Donax gouldii. Tivela stultorum* comprised around one percent of the collection by weight and only 0.2 percent by MNI. The remainder of the taxa was represented by trace amounts of material.

## 7.3 SUMMARY

The invertebrate faunal collection from SDI-812/H is overwhelmingly dominated by *Donax gouldii,* with low amounts of other shellfish present. This pattern is consistent throughout the site, both vertically and horizontally. Such a specialized strategy is likely explained by three factors: (1) the sandy beach habitat favored by *Donax* is the closest and most accessible shellfish habitat that could

have been exploited by the residents of SDI-812/H; (2) *Donax* populations frequently reach exceptionally high densities (ASM Affiliates 1996); and (3) *Donax* is easily collected and requires little or no processing prior to cooking (ASM Affiliates 1996).

In sum, *Donax gouldii* is the dominant shellfish in all analytical units, and all other taxa are present in insignificant quantities. Strong intrasite patterns exist, however, but they are largely limited to spatial differences in density and richness values. Such patterns generally reflect variations in the duration or intensity of occupation rather than changes in subsistence strategy. The relatively high densities and diversities of shellfish remains in Locus A and Unit 19 are important in this regard because they are consistent with trends of other artifact classes such as bone and lithic debris.

# 8 PALEOBOTANICAL ANALYSIS

## 8.1 INTRODUCTION

A macrobotanical analysis was conducted on the charcoal samples and botanical remains retrieved during SAIC's test excavations at SDI-812/H by Phyllisa Eisentraut (University of California, Los Angeles). This section details the results of this analysis and provides an overview of ethnohistoric plant use for the region. The ethnohistoric overview is presented first. It is followed by a discussion of methodology used and plant identifications made for the SDI-812/H materials. The results of the analysis are organized by locus. Data from Locus C are further separated into potentially prehistoric versus historic components.

## 8.2 ETHNOHISTORIC PLANT USE

SDI-812/H is located within the ethnohistoric territory of the Luiseño. As with the Gabrielino to the north and the Kumeyaay to the south, the Luiseño subsisted to a high degree on plants, with the single most important plant resource being the acorn. Six species of acorn from the Coast Live Oak to the California Black Oak were used (Sparkman 1908). Clusters of oak trees, their boundaries marked, were oftentimes owned by individual households and passed on from generation to generation (Bean and Shipek 1978). Oaks generally flower between March and May with fruits ripening in October and November (Munz 1974). Differences in elevation and distance from the coast affect maturation of fruits and would have allowed the Luiseño to schedule harvests (Culbert 1995). It is believed that the acorns with the greatest nutritional value grew in the mountains (Christenson 1992). White (1963) has suggested that acorns comprised almost 50 percent of the Luiseño diet.

The next most important plant resources used by the Luiseño were small seeds. The broad coastal terraces fronting the ocean hosted numerous taxa of economically useful grasses, composits, and perennial herbs. Wild oat, bromegrass, artemisia, sunflower, chia, and white and black sage were especially important resources. The Luiseño were known to use fire to manage the production of these plants. By burning at least every third year, the annual yield was maintained (Bean and Shipek 1978). The Kumeyaay, the Luiseño's southerly neighbors, planted and transplanted the taxa they found particularly useful, and employed controlled burns to foster new, tender grass shoots and reduce chaparral (Christenson 1990). Kumeyaay Delfina Cuero remarked that the Indians did not allow much fuel to accumulate because this reduced quality and increased the likelihood of damage by disease, fire, or parasites. The Kumeyaay also developed systems of erosion control and water management. Sparkman (1908) notes that Luiseño subsistence was similar to that of the Kumeyaay, suggesting that the Luiseño may have used similar techniques to foster the growth of useful taxa.

Other important seeds used by the Luiseño came from manzanita, lemonade berry, holly-leaf cherry, prickly pear cactus, lamb's quarters, pine, and wild rose. These seeds were generally parched, ground and cooked as a mush (Bean and Shipek 1978; Kroeber 1970; Sparkman 1908). The earliest written account of the SDI-812/H site area described the wild roses that covered the hillsides and named the locale a "rose-covered mesa, Las Rosales" (Schaefer 1992; Rosenthal and Padon 1994 in SAIC 1996b). The abundance of wild rose in the area may have been one of the initial reasons for Luiseño settlement at the site.

Fruits and fresh greens came from gooseberries, currants, thimbleberries, elderberries, wild grapes, wild strawberries, choke cherries, toyon, thistle, lamb's quarter, watercress, wild celery, miner's lettuce, California poppy, and tree clover (Kroeber 1970; Sparkman 1908). The fruits were eaten raw or dried for later use. The greens were eaten raw, cooked, or occasionally dried and stored. Sparkman (1908) noted that watercress and wild celery were always cooked, never eaten fresh.

The Luiseño used plants for a number of other purposes besides subsistence. More than 20 species are known to have been administered medicinally (Sparkman 1908). Several roots were uses as soap. Houses were thatched with asters, euphorbs, and sedges (Kroeber 1970). Bows were made from willow, elder, and ash. The characteristic arrow was of cane with a foreshaft of greasewood (Kroeber 1970). Fiber from Indian hemp, milkweed, and the common nettle was made into twine for bowstrings, net sacks, slings, and the front apron worn by women (Kroeber 1970; Sparkman 1908). A long grass comprised the coil of their usual basketry, with sumac being used for the splints. Woven and twined baskets were made from a rush. The juice from black nightshade berries was said to have been used for tattooing (Kroeber 1970). Tobacco and jimson weed were employed ceremonially (Sparkman 1908; Strong 1929).

Overall, Heizer and Elsasser's (1980:128) statement seems particularly apt for the Luiseño: "The California Indians seem to have found a use for almost any natural product they encountered on the land." They certainly appear to have discovered that most plants have useful properties and many can be used in several different fashions.

## 8.3 METHODS

All charcoal and seeds greater than 1/2-inch and a 25 percent sample of charcoal and seeds greater than 1/8-inch but less than 1/4-inch were scanned with a binocular microscope (10-40X magnification). All carbonized plant remains were separated out and identified to the most exclusive taxa with the use of the Eisentraut's comparative collection and several identification manuals (Delorit 1977; Martin and Barkley 1961; Musil 1963). Because seeds of different species can be similar, and burning often makes identification difficult, the recovered materials generally were only identified to family or genus level. In a few cases, species and/or subspecies was suggested given the geographic range of a particular taxon. A few seeds could not be identified due to a lack of distinguishing characteristics. These seeds were categorized as "unknown" or "amorphous" depending on physical condition.

## 8.4 RESULTS

Five types of seeds were identified to the family or genus level for the SDI-812/H material (Table 8-1). Poaceae, the most common taxa, included several genera, both indigenous and introduced. As noted above, burning tends to make already similar seeds difficult to identify; therefore, the

**Table 8-1. Macrobotanical Remains from SDI-812/H**

| *Locus* | *Unit* | *Level (cm)* | *Count* | *Material* | *Comments* |
|---|---|---|---|---|---|
| A | 1 | 10-20 | 1 | Poaceae | Fragment, resembles *Triticum* |
| C | 13 | 10-20 | 1 | amorphous | Fragment |
| C | 13 | 20-30 | 1 | amorphous | Fragment |
| C | 19 | 160-170 | 1 | cf. *Prunus* | Fragment |
| C | 19a | 140-150 | 1 | unknown | Fragment |
| C | 28 | 0-10 | 8 | *Haplopappus* | Resembles species *H. squarrosus* |
| C | 28 | 0-10 | 39 | *Haplopappus* | Resembles species *H. squarrosus* |
| D | 36 | 60-70 | 1 | Poaceae | Fragment, resembles *Triticum* |
| D | 37 | 60-70 | 2 | cf. *Triticum* | |
| E | 24 | 70-80 | 249 | Poacea | Some resembling *Avena, Bromus,* and *Festuca* |
| E | 24 | 70-80 | 1 | cf. *Rumex* | |
| E | 24 | 80-90 | 9 | Poaceae | Some resembling *Avena, Bromus,* and *Festuca* |

Poaceae seeds were compared to grass seeds known from the Camp Pendleton area and resemblances were noted. *Triticum,* a cultivated wheat, was an exception, and is discussed below. All of the taxa include species used ethnohistorically by either the Luiseño or the Kumeyaay, the Luiseño's southerly neighbors.

**General Overview of Identified Taxa**

*Haplopappus* is an annual or perennial herb or shrub of the Aster family. There are twenty-five species recorded in California. Of these, the species most likely found for the Camp Pendleton region is *H. squarrosus grindelioides,* a many stemmed shrub growing on dry slopes below 4,500 feet in Coastal Sage Scrub or Chaparral communities and blooming between July and October (Munz 1974:179). The Luiseño are known to have used several genera of aster as food, medicine, raw materials for arrows, and roofing (Bean and Shipek 1978; Kroeber 1970; Sparkman 1908), but no reference is made to *Haplopappus.* Delfina Cuero mentions in her autobiography that her family used *xatamu* (*Haplopappus* sp.) brush to roof their houses when reeds were not available. Heizer and Elsasser (1980) note that the leaves of several species of *Haplopappus* were used as medicine and the seeds and stems were used as food by many California Indians.

At least four types of Poaceae (Grass Family) seeds were recovered from SDI-812/H. One genus, *Triticum,* is discussed separately below. The grass family includes over 600 genera and 7,500 species world wide, with numerous native and introduced species distributed throughout San Diego County (Munz 1974:935-936). In fact, introduced grasses have been blamed for the demise of numerous native grasses along the San Diego coast (Culbert 1995). Grass seeds from SDI-812/H resemble *Avena, Bromus,* and *Festuca,* the first two taxa being utilized by the Luiseño (Kroeber 1970; Sparkman 1908). *Avena,* or wild oat, was introduced from Eurasia and is a common weed in disturbed places and on open slopes (Munz 1974:947-948). The hills around SDI-812/H were described as being green with wild oats by Griffin who camped at Las Flores in January of 1847 (Griffin 1942 in Brian F. Mooney Associates 1994). Luiseño burning practices most likely expedited the replacement of native grasses with *Avena.* The Luiseño ground oat seeds into a flour (Sparkman 1908). *Bromus* consists of over 100 annual and perennial species native to temperate regions of California. Kroeber (1970) and Sparkman (1908) recorded seeds from *B. maximus,* a

species not recorded by Munz, used for food by the Luiseño. The genus *Festuca* includes both native and introduced annual and perennial species, with many being important forage grasses. Of the over 100 species found in temperate and cool regions of California, several occur in Coastal Sage Scrub and Chaparral communities along the San Diego coast. Although no reference was found for Luiseño or Kumeyaay usage, "cool season grasses" such as *Festuca* were an important food source in the Southwest (Ebeling 1986:464).

The genus *Prunus* from the ancient Latin name for plum is known as stone-fruits. They produce fleshy drupes generally enclosing a single seed. San Diego County examples include bitter cherry, holly-leaf cherry, and choke cherry. These plants are evergreen and deciduous shrubs or small trees. Bitter cherry grows along rocky ridges and slopes from 2,000 to 8,000 feet. They flower from April to May. Holly-leaf cherry is prevalent on dry slopes and fans below 5,000 feet and is common to Chaparral communities. It also blooms from April to May. Choke cherries tend to grow in dampish places below 8,000 feet. Their fruits are edible but bitter, and are best eaten late in the season. They flower later than the previous two taxa, from May to June (Munz 1974). Kroeber (1970) recorded the Luiseño eating *P. demissa* and *P. ilicifolia* (holly-leafed cherry), but mentioned that neither variety was particularly abundant in Luiseño habitat. *P. demissa* is a species not recorded by Munz (1974). Sparkman (1908) noted that choke cherries were much liked by the Luiseño, notwithstanding their puckery taste. They supposedly improved after being kept for a few days after being gathered.

*Rumex*, an annual or mostly perennial herb commonly known as sorrel, includes introduced and native species, several of which are widespread in moist places (Munz 1974). Culbert (1995) identifies *Rumex* as a vernal pool plant. The Luiseño used the root of an unknown species of the plant in a medicinal decoction (Sparkman 1908). Kroeber (1970) recorded that *Rumex* was used medicinally by the Luiseño, but its specific virtues have not been reported. Delfina Cuero on a trip to Torrey Pines State Park said that her family ate the young leave of *Rumex cripus* boiled as greens, and then when the plant was old, the seeds were collected and ground on a metate for pinole. Marshy areas conducive to *Rumex* growth have been recorded along Las Flores Creek and near SDI-812/H (Brian F. Mooney Associates 1994).

The genus *Triticum*, or wheat, is a member of the Grass Family and consists of only introduced species. It is a native of the Old World and is a common cultivar. Munz (1974:1007) identifies *T. aestivum* for the Southern California area. He notes that it often escaped cultivation into waste places (Munz 1974). Agriculture at SDI-812/H, including the cultivation of grains (presumably wheat), was practiced during the Mission *Estancia* period of occupation, as well as during the Indian Pueblo Period. The Picos also sowed fields of grain at Las Flores after they wrested control of the pueblo from the Luiseño (Schaefer 1992). *Triticum* seeds are larger than most indigenous grass seeds, differentiating them from the other grasses identified at the site.

**Seed Identification by Locus**

Macrobotanical remains were recovered from four of the five loci (Table 8-1). A single macrobotanical remain was recovered from Locus A, a large grass fragment which was most likely *Triticum* (recovered at the 10-20 cm level). As Locus A includes the historic *Estancia* adobe ruins, the presence of an historic cultivar 10 to 20 centimeters below ground surface is in keeping with documented historic use of the locus. The wheat seed easily may have been associated with the

granaries Fr. Peyri described on December 31, 1823 for the *Estancia* at SDI-812/H (Englehardt 1921 in Schaefer 1992).

Macrobotanical remains from Locus C were the most diverse, including two amorphous types, numerous *Haplopappus* seeds, one *Prunus* fruit, and an unknown seed. The materials recovered near the surface of Unit 13 (10-20cm and 20-30cm) were badly eroded and could not be identified. Given their close proximity to the site surface, they are probably historic in origin. Seeds from Unit 28 (*Haplopappus*), retrieved between zero and 10 centimeters, are probably historic, if not modern, given recorded disturbance in this area. If the seeds are historic, they may represent the remains of a Luiseño house roofed with *Haplopappus*. The potentially prehistoric remains for this locus come from Units 19 and 19a where one *Prunus* fragment and one unknown roundish seed were recovered. *Prunus* fruits would have been available historically, but the depth at which the materials for Units 19 and 19a were found (160-170cm and 140-150cm, respectively) suggests that they are prehistoric in origin. Additional information for this unit could possibly answer this question.

The two seeds recovered from Locus D (*Triticum*) came from similar depths below ground surface (60-70cm level) and are representative of historic cultivation at the site. Unit 36 is believed to contain intact cultural deposits, while Unit 37, the location of the second seed, does not. A fluvially and/or mechanically disturbed oval area between the two units may be responsible for the depth at which the seeds were retrieved.

The 250+ grass seeds and the single *Rumex* seed from Unit 24 were recovered from the only area in Locus E believed to contain intact cultural deposits. These seeds are from taxa known to have been used ethnohistorically by the Luiseño, and potentially represent prehistoric use of the site. The location of the unit at the base of an alluvial fan and in close proximity to buried paleo surfaces further strengthens a prehistoric interpretation.

No macrobotanical materials were recovered from Locus B.

## 8.5 CONCLUSIONS

An overall interpretation of the macrobotanical remains from SDI-812/H is difficult given the small size of the sample. Ethnohistorically documented taxa were present at Loci C and E. An historic cultivar was retrieved from Locus A near the Mission Period *Estancia*, and from potentially mixed historic/prehistoric deposits within Locus D. It seems unlikely that the arrival of the Spanish in 1769 and the eventual establishment of Missions San Juan Capistrano and San Luis Rey in the region, completely disrupted traditional Luiseño subsistence practices, especially given Fr. Peyri's policy of allowing the Indians to remain in their villages. Delfina Cuero recalled her Kumeyaay grandmother telling her that when she was young and did not have to move from place to place so often (after the arrival of the Spanish), the Indians would clear a little place near their houses to plant greens, seeds, and roots that they liked. That way they had some food nearby. Documentary evidence from SDI-812/H suggests that garden plots were also maintained inside the *Estancia* by the Luiseño. It was probably not until after the missions were secularized in 1834 and the Picos gained control of the pueblo that the basic subsistence mode of the Luiseño still living at the site drastically changed. However, how the Luiseño incorporated Spanish, Mexican, and Anglo technology, knowledge, and subsistence into their traditional culture requires a larger

sample than available here. Without a larger sample, it is impossible to tell if the plants with ethnohistorically known uses were prehistoric or historic in origin.

# 9 SITE INTERPRETATIONS

## 9.1 SITE CONTEXT

SDI-812/H contains archaeological deposits that include Prehistoric, Ethnohistoric, Mission, and American Periods, and has radiocarbon dates ranging from A.D. 1475 to A.D. 1950 (Figure 9-1). SAIC's 1995 testing program included surface survey, scrapes, stratigraphic trenching, auguring, unit excavations, laboratory cataloging, and a cultural material analysis. Material was collected from 38 hand-excavated units (23.1 $m^3$) distributed throughout an area measuring 227,005 $m^2$. The historic deposits are concentrated in and around the *Estancia* ruins in Locus A and in the standing Las Flores Adobe Ranch House in Locus B. Archival data suggest a variety of Native American activities related to *rancho* operations occurred in the outlying portions of the valley (i.e. Loci C, D, and E). These activities would have included farming, gardening, and tending of mission cattle herds. It is quite likely that Native Americans continued to use the *Estancia* and (presumably) outlying areas after they received title in 1833-34 and provided manual labor to the Las Flores Ranch after 1867-1868.

Late Prehistoric/Protohistoric Luiseño deposits were documented beneath the ruins in Locus A and buried beneath the ground surface in Loci C and D. These deposits likely represent the recorded Luiseño village of *Huisme*. The presence of a buried A horizon in Loci C, D, and E indicates the potential for additional prehistoric deposits at SDI-812/H. Analysis of the results from the testing program did not document specific information dealing with pre-contact settlement patterns. Although it is likely that some level of use occurred on a year-long basis at Loci A and B, it is unclear how or during what seasons the remaining area of the site was used, either in the prehistoric or historic periods.

An updated site record form is provided as a confidential appendix (Appendix I) and has been submitted to the South Coastal Information Center and the San Diego Museum of Man.

## 9.2 INTRA-SITE VARIABILITY

Archaeologically, temporal and functional differences in the cultural deposit were noted. Although a limited number and diversity of artifacts were recovered, a disparity was noticed in the vertical and horizontal distribution between artifact types. Lower densities of historic and prehistoric materials in Loci C, D, and E may suggest activities requiring few disposable artifacts and probably relate to non-residential behavior. Although evidence was not recovered during this testing program, activities such as cattle ranching or tending of garden plots would be likely for Loci C, D, and E during post-contact period. Behavioral patterns associated with habitation and residential activity, such as trash scatters, privies, and diverse midden deposits would be expected in Locus A (containing the *Estancia*) and Locus B (the Las Flores Adobe).

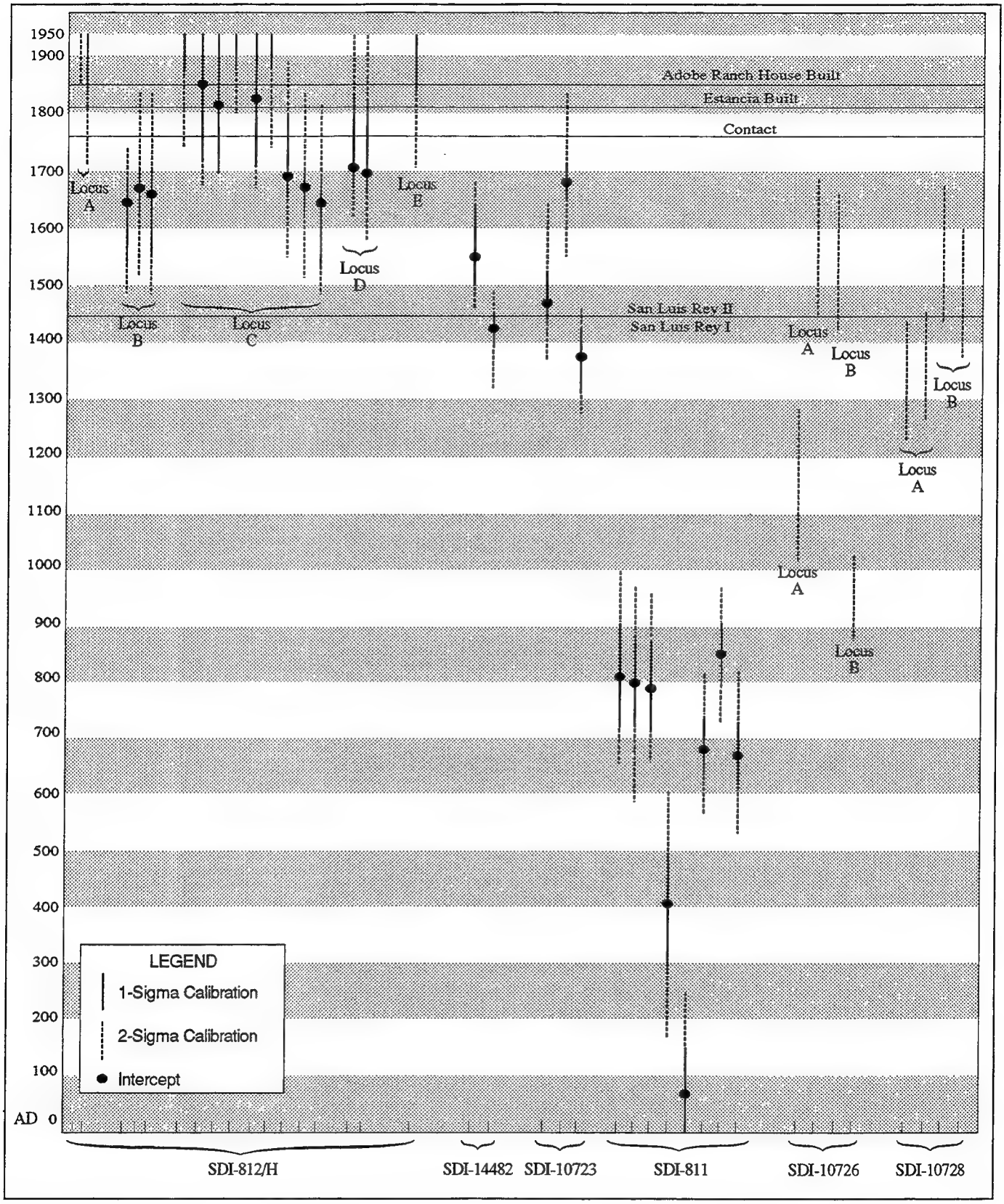



**Figure 9-1. Late Prehistoric Radiocarbon Dates from Archaeological Sites in Las Pulgas Canyon, Camp Pendleton**

Locus A contained the highest density of Tizon Brownware, Spanish tile/brick and animal bone; Locus B contained the highest density of historic glass, ceramics, metal, debitage, flaked stone tools, groundstone, and fire-affected rock. The increased density and vertical placement of the metal (to a depth of 80 cm) can not be accounted for. The second highest density of faunal remains, in terms of bone count, was recovered from Locus C (dominated by small mammals). Density of shellfish remains was highest in Locus D. Locus E contained minimal density of both historic and prehistoric materials, although the highest density of macrobotanical remains.

Vertical distributions for each locus were generally unimodal in Locus A. Over 50 percent of the cultural material was recovered between the 20-30 cm level. Spatial variability within this area included higher densities of animal bone in Units 7, 7a, 9, and 9a (60 percent of the total), shell in Units 1, 2, and 4 (47 percent assemblage), Tizon Brownware in Units 7, 7a, 9, and 9a (60 percent of the total), flaked stone in Unit 4 (23 percent of the assemblage), and historics in Units 2, 9, and 9a (60 percent). These patterns may indicate a more concentrated trash dump or midden deposit. A higher density of flaked stone in Units 1 and 4 may indicate the presence of activity areas associated with prehistoric, rather than historic use. In Locus A, five of the twelve units had profiles extending below 50 cm. These units are located south and southeast of the *Estancia* ruins. A deeper profile may suggest more intensive use of the site.

Locus B exhibited a well developed A horizon containing cultural materials to a depth of 35-60 cm. Vertical distributions for this area were slightly bimodal, with the majority of the historic artifacts collected from the 10-20 cm level, prehistoric materials at the 20-30 cm level. This difference probably reflects the presence of a historic component (the Las Flores Adobe) resting on top of a prehistoric midden. Because of the small sample (three excavated units), horizontal differences throughout the locus are difficult to identify. Unit 31 contains the highest density of shell (71.1 percent of the assemblage); Unit 33a the highest density of bone (50.3 percent); and Unit 30 the highest density of glass (69.0 percent) and metal (85.0 percent). Additional testing in this area would be required to determine if these differences represent cultural behavior rather than general site deposition. Differences in the prehistoric assemblage were noted between Loci A and B, with fewer Tizon sherds recovered from Locus B (198.2 sherds/$m^3$ recovered in A; 9.3 sherds/$m^3$ in B). This difference may be reflective of site use after the construction of the Las Flores Adobe and habitation patterns associated with the *Estancia*.

Locus C contains two distinct stratigraphic deposits: a top deposit containing a mixture of historic and prehistoric materials (0-60 cm) and a buried prehistoric component (130-180 cm). The buried deposit probably represents a pre-contact Luiseño residential deposit. Because of the buried deposit (recovered in Units 19, 19a, and 19b), the vertical distribution of cultural materials is bimodal.

Limited cultural materials were collected from Loci D and E. Although not documented in the excavation units, a buried surface is also present in Locus D, east of Unit 37. Additional testing will be required before comparisons can be made with the buried component recovered in Units 19, 19a, and 19b. Locus E is distinctive with the recovery of a seed cache in Unit 24. Seeds from this area were used ethnohistorically by the Luiseño, and potentially represent prehistoric use of the site.

## 9.3 SETTLEMENT PATTERNS AND SUBSISTENCE STRATEGIES

Depending on the time period (prehistoric, mission, post-mission) settlement patterns and use of the entire site would have been different. Faunal remains recovered from Loci A and B are dominated by large mammal remains. These two loci are the only areas of the site to yield discretely identified remains of domesticated mammals (cattle, sheep, and pigs). Butchered cattle bones (two ribs) were found in Locus B. Archival records clearly show that domesticated animals would not have been available until post-1769 (initial Spanish contact). The founding of Mission San Juan Capistrano (1776) brought the Las Flores *rancherías* into the Spanish political and religious sphere of influence. Baptisms from *Huisme ranchería* at Las Flores appear as early as 1779 in the San Juan Capistrano records. Mission San Luis Rey was the next mission to be founded in 1798. Much of the surrounding areas, including SDI-812/H, was incorporated into generalized mission use. Unlike other missions, Fr. Antonio Peyri's (Mission San Luis Rey) policy favored keeping the Luiseño at their own villages rather than bringing them all into the mission proper. Thus, during post-contact periods some level of their original Luiseño settlement pattern was maintained. Archival data, along with the radiocarbon dates firmly places both Loci A and B into a post-contact period. Although prehistoric artifacts were collected in both areas (Tizon Brownware and flaked stone artifacts), a faunal assemblage distinctive of prior prehistoric occupation was not found in either Loci A or B.

The vertebrate assemblage recovered from Loci C, D, and E lacks evidence of domesticated mammals. Small mammals (particularly rabbit) dominated the assemblages. In addition to the shift from large to small mammal exploitation, the three outlying areas contain fewer numbers of identified species. Based on the identified assemblages, Loci C, D, and E resemble a prehistoric rather than a historic use pattern. The faunal assemblage recovered from Units 19, 19a, and 19b (the buried Locus C component) further supports this temporal association. While the prehistoric patterns discernible in Locus C and Units 19, 19a, and 19b are apparent, the small sample size recovered in Loci D and E limits interpretation of these two areas. In conjunction with the changes in the faunal assemblage, radiocarbon dates support earlier use in Loci C, D and E (see Table 5-2).

Shellfish exploitation is an important aspect of the subsistence system. Overall, the five areas are dominated by *Donax gouldii* in terms of both shell weight and minimum number of individual counts. The remaining species appeared only as trace elements. Documenting the diversity of shellfish is an important variable in determining temporal difference in resource use, site catchment, and seasonal occupation. Because a limited sample of the assemblage was studied, additional testing will be required to evaluate any differences in density and taxon variety.

An overall interpretation of the macrobotanical remains from the site is difficult given the small size of the recovered sample. Ethnohistorically documented taxa were present at Locus C and E. An historic cultivar was recovered from Locus A, near the Mission period *Estancia*, and from potentially mixed historic/prehistoric deposits in Locus D. Archival evidence for the site suggests that the Luiseño tended small garden plots. It was probably not until after the missions were secularized in 1834 and the Picos gained control of the pueblo that the basic subsistence mode of the Luiseño still living at the site drastically changed. However, how these changes were incorporated into traditional cultural patterns can not be addressed with the macrobotanical remains recovered during this testing program.

Differences in flaked stone material preference was noted in each of the five areas (Table 9-1). Materials recovered from Units 19, 19a, and 19b (the buried component of Locus C) are particularly important in documenting the differences between a prehistoric assemblage and one associated with post-contact periods. Based on the radiocarbon dates (see Table 5-2), at some point in time after the occupation noted in Units 19, 19a, and 19b, the use of chert and quartz changes. This shift may be attributed to changes in procurement of raw materials associated with the mission system. Additionally, other than those recovered in Units 19, 19a, and 19b, the recovery of small, finely flaked projectile points (typical of San Luis Rey II assemblage) is absent.

**Table 9-1. Flaked Stone Material Preference by Locus**

| | *Locus A* | *Locus B* | *Locus C* | *Locus D* | *Locus E* | *Units 19, 19a, 19b* |
|---|---|---|---|---|---|---|
| *Debitage* | | | | | | |
| Volcanic | 59.4% | 66.8% | 30.1% | 13.3% | 37.8% | 31.5% |
| Chert | 17.2% | 20.9% | 49.4% | 37.1% | 18.9% | 53.8% |
| Quartz | 21.6% | 11.5% | 19.5% | 42.7% | 43.2% | 14.4% |
| Other | 1.8% | 0.8% | 1.1% | 6.9% | 7.1% | 0.3% |
| *Flake Stone Tools* | | | | | | |
| Volcanic | 46.7% | 76.9% | 10.5% | - | - | 13.3% |
| Chert | 20.0% | 7.7% | 57.9% | 50.0% | - | 60.0% |
| Quartz | 20.0% | 7.7% | 21.1% | 50.0% | - | 20.0% |
| Other | 13.3% | 7.7% | 21.1% | - | - | 6.7% |

# 10 NATIONAL REGISTER EVALUATION

## 10.1 INTRODUCTION

This section evaluates whether previously unevaluated portions of SDI-812/H are considered eligible for listing on the NRHP according to 36 CFR 60.4. The significance of prehistoric-archaeological, historic, and architectural resources is evaluated based on the criteria for inclusion in the NRHP as defined in 36 CFR 60.4 and in consultation with the State Historic Preservation Officer. According to these criteria, the quality of significance is present in districts, sites, buildings, structures, and objects that:

a. Are associated with events that have made a significant contribution to the broad patterns of history, or

b. Are associated with the lives of persons significant in the past, or

c. Embody the distinctive characteristics of a type, period, or method of construction or represent the work of a master or possess high artistic value or represent a significant and distinguishable entity whose components may lack individual distinction, or

d. Have yielded, or may be likely to yield, information important in prehistory or history.

To be listed in or determined eligible for listing in the NRHP, a property must meet at least one of the above criteria and must possess integrity, which is defined as the authenticity of a property's historic or prehistoric occupation or use. Included are integrity of location, design, setting, materials, workmanship, feeling, and association. If a property retains the physical characteristics it possessed in the past, it has the capacity to convey information about a culture or people, historical patterns, or architectural or engineering design and technology.

Evaluating the significance of American Indian cultural resources requires consultation with affected tribal groups to develop relevant defensible criteria for establishing the relative importance of tangible and intangible resources. Certain categories of tangible American Indian cultural resources, such as ancestral settlements or petroglyph and pictograph sites, may be afforded protection through their eligibility for the NRHP. However, natural features such as biota and spiritual locations are not addressed in historic preservation legislation unless their historic use can be documented. Such features, as well as the more intangible resources that contribute to the uniqueness and maintenance of American Indian cultures and communities, are addressed in the American Indian Religious Freedom Act.

## 10.2 HISTORY OF NRHP AND NHL LISTING

SDI-812/H has a complex recordation history that is summarized in SAIC (1996c). Three previous evaluation reports have been prepared: Wee and Mikesell (1991), Schaefer (1992), and SAIC (1996b). Wee and Mikesell (1991) updated the NRHP Registration Form for the Las Flores Adobe, a California *rancho* house that was originally listed in the NRHP in 1975. The adobe is also a National Historic Landmark. Wee and Mikesell's update was approved and signed by federal agencies and the California OHP in 1993 and entered in the NRHP on May 20, 1993. The update states that the Las Flores Adobe is significant at the National level for the period of 1868 to 1888 and significant at the Local level for the period of 1888 to 1941. The Las Flores Adobe is:

- Significant at the National level in the area of architecture (National Historic Landmark Criterion 4 and National Register Criterion C), as an exceptionally good example of the California Ranch House;

- Significant at the National level in the area of social history (National Historic Landmark Criterion 1 and National Register Criterion A); and

- Significant at the local level in the area of agriculture (National Register Criterion A) as the headquarters of a locally important lima bean farm.

Schaefer (1992) prepared an updated NRHP Registration Form for the Las Flores *Estancia*, which was originally listed on the NRHP in 1957. The *Estancia* ruins were also designated as a State Historical Landmark in 1984. Schaefer's update was based on extensive archival documentation and excavation of 13 shovel test pits in the archaeological deposit surrounding the ruin. The updated Registration Form was not submitted for federal agency or OHP approval signature but MCB Camp Pendleton concurs with Schaefer's evaluation (Schaefer 1992: Section 8: 17-22) that the ruin and associated archaeological deposits are:

- Significant at both the National and State levels in the area of Social History and Native American Ethnic Heritage (National Register Criterion A) because it "embodies the chronicle of events and social processes whereby native tribal communities were forced to adapt to the drastic changes incurred by the expansion of European and American hegemony" and it "symbolizes the efforts of the Luiseño to retain their autonomy despite Euro-American imperialism and colonialism "; and

- Significant at both the National and State levels in the area of Prehistoric, Historic Aboriginal, and Historic Non-aboriginal Archaeology (National Register Criterion D) for its potential to augment the archival record and address substantive research questions concerning Native American adaptations and activities during the Prehistoric, Mission, Indian Pueblo, and American periods.

## 10.3 UPDATED EVALUATION OF SDI-812/H

Previous NRHP and NHL evaluations described above did not include a discussion of all archaeological deposits on the site. Preliminary results of SAIC's recent excavations at the site provide sufficient data to update the evaluation to include these areas.

## Site Integrity

Large areas of the site retain good to excellent integrity despite the effects of a variety of natural and cultural disturbances. In general, cultural materials in surficial contexts have received the most disturbance while buried deposits have received little or no disturbance. Site disturbances from natural processes include bioturbation and stream erosion, and fluvial mixing from Piedra de Lumbre Creek. Road construction has removed, truncated, or capped cultural deposits in a narrow band along Las Pulgas Road. Several dirt roads created by tank travel have also removed or disturbed cultural deposits, although to a lesser degree. Historic farming activities such as discing and plowing have created "plow zones" and slightly compacted surficial cultural deposits in several loci. Despite such disturbances, the site retains sufficient vertical and horizontal structure to address a wide range of research questions. The integrity of each major site locus and the APE is described further below.

**Locus A**: Integrity is fair to very good, depending on location. Archaeological deposits in the compound surrounding the Las Flores *Estancia* ruins extend to approximately 60 cm. Bioturbation, disking, and other farming activities have slightly compacted and disturbed the deposit, but it retains its essential vertical and horizontal structure. In addition, spatial variability in the distribution of cultural materials suggests the potential to identify trash deposits and activity areas. Although a narrow dirt road has removed approximately 10-20 cm of the deposit in a small portion of the locus, there is high potential for intact features in the rest of the locus, particularly within and beneath the ruins of the *Estancia*. An intact portion of an adobe wall is still standing.

**Locus B**: Integrity is fair. Most of the locus has been surficially disturbed by the dirt road and modern use of the Las Flores Adobe, but testing indicates relatively intact archaeological deposits extend 60 to 70 cm below the ground surface. Historic and modern debris concentrate in the upper 20-30 cm, suggesting lower deposits represent relatively intact materials that may pre-date the Adobe's 1867 construction. Archival data suggest privies and other historic features may be present.

**Locus C**: Integrity is good to excellent overall, although some areas along Las Pulgas Road are highly disturbed. Surficial as well as buried cultural deposits occur throughout the locus. Rodent disturbance is present but well defined stratigraphic boundaries indicate the cultural deposits retain their integrity. A narrow dirt road in the northern part of the site has truncated a small portion of the uppermost cultural deposit. Tank traffic and cultivation have affected the uppermost deposit and the presence of numerous depressions and mounds suggest localized disturbances. Buried deposits exhibit excellent integrity.

**Locus D**: Integrity is fair to good in most parts of the locus. Both surficial and buried deposits exhibit good stratigraphic integrity except in the eastern part of the locus near Piedra de Lumbre Creek. In this area fluvial action and mechanical disturbance may have mixed the deposits to a depth of 1 to 2 m.

**Locus E**: Integrity is poor to excellent, depending on location. Some, but not all, areas near Las Pulgas Road are severely disturbed down to 40-70 cm and exhibit a mixing of fluvial sands and blocks of A horizon material, suggesting this area has been affected by mechanical ripping and/or rolling in of broken soil mixed with unaltered alluvium. However, such disturbance does not characterize all areas along Las Pulgas Road because a buried cultural deposit was found immediately southeast of the road in Unit 23.

**APE**: The pipeline will be placed beneath Las Pulgas Road. It was not possible to conduct archaeological excavations in this heavily used road so the integrity of the site within the APE is extrapolated from archaeological excavations on both sides of the road. The APE contains low to medium density deposits throughout its length, although the deposits are localized and seem to be separated by areas void of cultural materials. The intact deposits occur in surficial as well as in buried contexts. Although road construction may well have removed deposits immediately beneath Las Pulgas Road, the available data do not rule out the possibility that intact deposits occur within the APE. If present, they are probably shallow enough to be affected by the 7-foot deep pipeline trench.

**Significance Under Criterion A: Social History and Native American Ethnic Heritage**

Schaefer's (1992) evaluation of the Las Flores *Estancia* and its archaeological deposit in Locus A provides a detailed historic context for evaluating the entire site under this criterion and should be reviewed in its entirety. In his evaluation, Schaefer states that:

> The site of Las Flores or San Pedro embodies the chronicle of events and social processes whereby native tribal communities were forced to adapt to the drastic changes incurred by the expansion of European and American hegemony. This process of change occurred throughout the world during the period of European Colonialism and Las Flores represents that process in microcosm (Schaefer 1992, Section 8, page 17).

This statement can be extended beyond Locus A to the entire site, which contains archaeological deposits dating to Prehistoric, Protohistoric/Ethnohistoric, Mission, Mexican, and American Periods. Late Prehistoric/Protohistoric Luiseño deposits occur beneath the ruins in Locus A and lie buried beneath the ground surface in Locus C and D. These deposits may in part or in whole be associated with the local Luiseño village of *Huisme*. The presence of multiple deeply buried A horizons in loci C, D and E indicates the potential for additional prehistoric deposits to exist within the site.

The most extensive and rich deposits dating to the Mission and Mexican Periods are located in Locus A around the *Estancia*. Dense concentrations of Native American artifacts attest to the heavy use of the *Estancia* and its grounds by local residents. Archival data suggest a variety of Native American activities related to *rancho* operations also occurred in outlying portions of the valley (i.e. loci C-E), including farming, gardening, and tending large cattle herds. Native Americans continued to use the *Estancia* and (presumably) outlying areas after they received title in 1833-34. Las Flores thus became a *Pueblo Libre* or Free City, one of the few California Indian communities to retain unity and identity during and after mission secularization (Schaefer 1992: Section 8, page 17). Although they lost title to Pio Pico in 1844, a fairly large Native American population continued to reside in the valley until 1855 or so. Some probably stayed and worked in the Las Flores Adobe after it was built in 1867-1868. If so, Locus B may contain evidence of Native Americans during the American Period.

Las Flores also is considered significant for Native American Ethnic Heritage for it symbolizes the efforts of the Luiseño to maintain group identify and autonomy in the face of Euro-American imperialism and colonialism (Schaefer 1992, Section 8, page 17). This significance extends to all archaeological loci at SDI-812/H.

**Significance Under Criteria A and D as a Rural Historic Landscape**

The concept of a rural historic landscape is applicable in evaluating the significance of SDI-812/H. For purposes of the National Register, a rural historic landscape is defined as a geographical area that historically has been used by people, or shaped, or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features (National Register Bulletin #30:1-2). Rural landscapes commonly reflect the day-to-day occupational activities of people engaged in traditional work such as mining, fishing, and various types of agriculture. Often, rural landscapes have developed and evolved in response to both the forces of nature and the pragmatic need to make a living. In using the theme of rural historic landscape, development of and an understanding of the historic context is essential.

The generalized history of the mission period for California, and particularly the development of the various mission and out-posts have been extensively documented and studied by numerous researchers. The Las Flores site contains elements of use from prehistoric/ethnohistoric Luiseño occupation, through the Mission Period, Mexican Period, and into the American Period. The site was first occupied by prehistoric Indians and then an ethnohistoric Luiseño village. In the Spanish Period it became a *rancho* of Mission San Luis Rey, and then appears to have expanded to an *Estancia* or *rancho* with upgraded chapel and providing occasional liturgical services (Locus A, established in 1823). It became an Indian Pueblo in the Mexican Period during the process of mission secularization. Finally it was absorbed by Pio and Andres Pico into the Rancho Santa Margarita y Las Flores. The Pueblo inhabitants continued to reside at the compound but eventually abandoned it by the time the *Rancho* came into the possession of John Forster in 1864, whose son, Marcus built the neighboring adobe *rancho* (Locus B, 1867). The compound was subsequently used as a corral and stables (Schaefer 1992). Activities such as gardening, agriculture, and cattle raising were carried out within the boundaries of the site (which would include Locus C, D, and E). Radiocarbon dates acquired during the testing shows that this area has been occupied (used) since the early 1700s.

Spatial organization, concentration of historic characteristics, and evidence of the historic period of development distinguishes a rural historic landscape from its immediate surroundings. In developing guidelines for evaluating significance, a classification system of eleven characteristics was developed (NR Bulletin #30:3-5). The first four characteristics are processes that have been instrumental in shaping the land (i.e. land use and activities, patterns of spatial organization, cultural traditions); the remaining seven are physical components that are evident on the land (i.e. vegetation related to land use, buildings/structures and objects, archaeological sites, clusters, small-scale elements). Establishment of the mission system and associated support facilities meets all of the characteristics listed above. The Las Flores sites represents only one of twelve remaining sites associated with the Mission Period. Development of this system was directly reflective of the cultural traditions for the time period. Religious beliefs, social customs, ethnic identity, and trades and skills were integral factors in developing and maintaining the various mission-related sites. Archaeological testing at SDI-812/H has provided information for a continuum of site use from prehistoric through the historic period. Specific activity areas, such as possible corrals, gardens, work areas, and the like have not been identified in this testing program, leaving the possibility that additional study is warranted in all five loci.

Using the concept of historic rural landscape, this site would be significant under both Criterion A and D. Criterion A recognizes the significant contributions that rural properties have made through diverse events and activities, including exploration, settlement, ethnic traditions, farming, animal husbandry, ranching, and the like. Although significant events are often closely related to land uses, historic significance is not usually equated with general land uses or the functions of specific buildings or structures. The concept of significance, under Criterion A, looks at the continuum of use and how the area reflects the period of time in which the event took place. The Las Flores site contains five loci with evidence of both prehistoric and historic and use. Two of the loci, Locus A (the *Estancia*) and Locus B (the adobe) are already on the National Register and California State Register. The remaining three loci (Locus C, D, and E) would be considered contributing elements to the overall significance of the area, namely, the continual use from prehistoric to Mission to Mexican and finally to the American Period.

Criterion D applies to properties that have yielded or are likely to yield information important to prehistory or history. Surface or subsurface remains may provide information regarding the agricultural land uses or settlement patterns. Vegetation and landscape features may themselves provide archaeological evidence. Pollen and soil studies, along with macrobotanical and faunal studies can provide information regarding past uses or activities. Archival information suggests that a number of small activity areas associated with gardening, agricultural fields, and/or cattle raising would be present within the site boundaries. The macrobotanical and faunal studies completed for the test units indicate a shift in prehistoric subsistence patterns, to introduced cultigens and cattle. Additional archaeological testing would address questions relating to the extent of such changes and potentially recover artifacts reflective of culture change and adaptation.

**Significance Under Criterion D: Archaeology**

SDI-812/H contains a wide variety of intact cultural deposits that exhibit a diversity of archaeological material. As such, the site can yield important information about the prehistory and history of southwestern California, particularly the poorly documented coastal areas of Camp Pendleton. Major research issues that can be addressed with data from the site include Chronology and Dating, Native American Acculturation, Function of Mission Outposts, Ranchero Lifestyle and Economy, Subsistence Orientation, Seasonality and Settlement Organization, Trade and Exchange, Paleoenvironmental Reconstructions, and Native American Heritage Values.

*Chronology and Dating*

The dearth of radiocarbon dates from Camp Pendleton sites severely hampers attempts to describe and explain prehistoric and ethnohistoric adaptations in the region. Radiocarbon dates that have been collected have been too few in number to establish fine-grained temporal control for this area and as a result there is no local chronology and the occupational history of the area is known only in the most general terms (e.g., Archaic, Late Prehistoric).

SDI-812/H has excellent potential to help establish a local chronology. It contains a wide variety of surficial and buried cultural deposits and each one contains the marine bean clam (*Donax*) in sufficient quantities to obtain large suites of radiocarbon dates with small margins of error. The presence of historic artifacts also suggests that larger samples from the site will yield more temporally diagnostic items that will help provide tighter chronological placement of Historic Period assemblages, particularly those associated with the *Estancia*. Establishing tight temporal control over the site's numerous cultural and natural strata will allow research to address a wide

range of topics, including culture history, acculturation, subsistence orientation and settlement organization, trade and exchange, and paleoenvironmental change.

Datable materials from the site can also help address methodological issues concerning the use of different materials for radiocarbon dating. These materials primarily include the bean clam (*Donax*), the California mussel (*Mytilus*), bone, and charcoal. *Donax* is by far the most abundant class of datable materials, not only at this site but at all other prehistoric sites in Las Pulgas Canyon (ASM Affiliates 1996; SAIC 1998). To place the Las Pulgas sites in a regional and local context, it is important to evaluate whether radiocarbon dates from *Donax* are comparable to those derived from other materials, particularly (*Chione*) and (*Argopecten*), bone, and charcoal. For example, *Mytilus* has been used to date many prehistoric sites throughout coastal California but it occupies rocky marine habitats while *Donax* is limited to exposed sandy beaches, some of which are associated with sources of freshwater. Dr. Murray Tamers of Beta Analytic Inc. indicates that absolutely contemporary specimens of *Mytilus* and *Donax* may yield different radiocarbon dates due to such habitat differences (personal communication, Tamers 1995). SDI-812/H site contains multiple classes of datable remains from sealed (buried) contexts that can be used to calibrate *Donax* dates with those from *Mytilus*, charcoal, and bone, thus contributing to the development of a reliable cultural chronology for the region.

*Native American Acculturation*

Test excavations at SDI-812/H indicate that Schaefer's 1992 evaluation of the significance of the archaeological deposit surrounding the *Estancia* in Locus A can be extended to include the rest of the SDI-812/H:

> Las Flores has the potential to address substantive research questions concerning adaptations of Native American communities to rapid socio-political change. Preserved in the ruins is an archaeological record that spans the Prehistoric Period, Spanish Mission Period, Mexican Pueblo Period, and early American Period. The missions were the vanguard of Spanish colonialism in California whose goal was to prepare Native peoples for co-existence with European culture and colonial rule. The *Estancia* represented the furthermost extension of the system directly into native territory and residences. How these populations reacted and adapted to these intrusions over time is a major area of inquiry for historians, archaeologists, and anthropologists working throughout the Southwest.... (Schaefer 1992, Section 8, page 19).

Prehistoric and historic remains from SDI-812/H, coupled with data recovered from other prehistoric sites in the valley, provide an excellent comparative database to measure the effects of colonialism on Luiseño culture. Prehistoric/ethnohistoric deposits occur beneath the *Estancia* in Locus A. Although some of the deposit was scraped away for use in constructing adobe walls, the remaining deposit is likely to be well preserved. Locus C contains an intact, deeply buried Late Prehistoric/ethnohistoric residential midden deposit dating between A.D. 1530 and A.D. 1800. Native American deposits in loci D and E yielded radiocarbon dates with standard deviations that span prehistoric and historic periods. Loci C, D, and E all contain multiple buried A horizons that have the potential to yield additional prehistoric and early historic deposits.

Mission Period deposits, of course, predominate in Locus A. Test excavations in areas adjacent to the ruins yielded a relatively dense and diverse assemblage of Native American artifacts, a

relatively limited assemblage of historic artifacts, and a faunal assemblage dominated by cattle. Charred seeds and other macrobotanical remains are present. Considerable spatial variability in these areas suggests the possibility of activity areas and the main trash dump. Broader excavations within and adjacent to the ruins would help define the nature and location of Native American activities associated with construction and operation of the *Estancia*, and the analysis of larger samples of artifactual, faunal and floral remains from these areas would help determine how and to what extent the Luiseño incorporated new technology, knowledge, and foods into their traditional culture. Archaeological deposits in portions of loci C, D and E have the potential to yield additional information on the nature and location of Native American activities during historic periods. Documentary sources suggest that Native Americans tended cattle and participated in large cattle roundups, farmed, and established gardens for their personal use in this portion of the valley. All loci can contribute to an understanding of the Social History of the Luiseño.

Las Flores also is considered significant for Native American Ethnic Heritage because it symbolizes Luiseño efforts to retain cultural identify and autonomy despite Euro-American rule. Schaefer (1992, Section 8, page 18) indicates that as late as 1961, Macario Kalac of the Rincon Indian Reservation could still recall stories of life at Las Flores.

***Function of Mission Outposts***

Mission outposts like Las Flores *Estancia* and its *rancho* operations remain a poorly studied aspect of the mission system. Schaefer (1992, Section 8, page 20-21) adequately addresses the importance of Locus A in this regard, but we now know that archaeological deposits in Loci C, D, and E have the potential to yield information related to the *Estancia's rancho* operations. For example, archival data indicates that large cattle roundups were often held in this part of the valley. Did *vaqueros* establish temporary work camps or other discrete areas of activity during these roundups? Is there any evidence in this area for permanent or temporary encampments? Broad excavations would be required to find and document such areas.

***Ranchero Lifestyle and Economy***

The Las Flores Adobe in Locus B is listed on the NRHP and is a NHL in part because it is "an important and late example of the unique ranchero culture and economy that developed in California during the middle decades of the 19th century" (Wee and Mikesell 1991, Section 8 Summary Paragraph, Statement of Significance). Testing has shown that Locus B also contains a dense archaeological deposit that has the potential to yield important information on the lifestyle and economy of historic inhabitants of the Las Flores Adobe. Broad scale excavations to identify intact features such as privies and trash pits would be the most productive approach to obtaining such data.

***Subsistence Orientation***

Reconstructing subsistence practices at a site is a necessary precursor to describing and explaining mobility strategies and settlement organization. Recent work at three nearby sites indicates significant variability in prehistoric resource use and habitat exploitation, but larger samples are needed to address questions regarding subsistence orientation, and the role and dietary importance of specific resources from different habitats (ASM Affiliates 1996, 1997; SAIC 1998). Similarly, analysis of faunal and floral samples from SDI-812/H have yielded important new

information about prehistoric and historic period subsistence, but further excavations and analyses are needed before subsistence patterns can be reliably identified and described in terms of temporal, seasonal, or logistical factors. The presence of bone, shell and to a lesser degree macrobotanical remains in many different cultural strata indicates SDI-812/H can address a wide variety of research questions regarding resource use, habitat exploitation, and seasonally:

- What specific floral and faunal resources are represented at this site? Is there evidence of storable resources such as seeds or acorns? Is there evidence of a maritime fishing economy?
- What habitats were exploited? Were these all available in the immediate vicinity of the site?
- Does resource use and habitat exploitation suggest foraging or logistically-based collecting?
- What was the dietary emphasis and protein contribution of these resources?
- Was coastal exploitation seasonal or year-round?
- Is there evidence of temporal changes in resource use during the prehistoric period?
- What trends are evident when comparing SDI-812/H to other nearby sites?
- Can temporal and spatial variations during prehistory be explained by seasonal changes in resource availability, changing environmental conditions such as loss of estuary habitats during rising sea levels, or do they reflect changes in resource procurement goals, duration of occupation, or settlement organization?
- How did the availability of cattle and other introduced foods during the historic period modify prehistoric patterns?

*Seasonality and Settlement Organization*

Many recent studies of prehistoric settlement and subsistence in California have focused on documenting and explaining the development of complex Native American cultures in coastal areas. For the Camp Pendleton area, early Spanish accounts and ethnographic sources suggest ethnohistoric and historic occupation by the Luiseño and Juaneño was characterized by relatively high population densities and occupation of permanent villages, each of which owned and defended a bounded territory with specific hunting, collecting and fishing areas. Distant resources may have been procured by special task groups, but seasonal dispersal into small family groups may have been practiced at some times and places. Although it is generally recognized that such a complex system arose from a much earlier foraging pattern, the nature and changing dynamics of prehistoric adaptation in the Camp Pendleton area are poorly understood (see ASM Affiliates 1996 for further discussion). Even the most basic research questions remain to be addressed at most sites.

SDI-812/H has excellent potential to contribute to the study of settlement organization in this area. The site contains multiple surface loci and numerous buried deposits with excellent preservation of artifactual and ecofactual remains. The presence of so many stratigraphically discrete cultural

deposits, and evidence of considerable horizontal and vertical variability in artifact densities, illustrates the site's potential to yield fine-scale data on the nature, duration, diversity, and seasonality of on-site activities over a variety of time periods. Recent work at other sites in the drainage (ASM Affiliates 1996, 1997; SAIC 1998) provides a comparative database that enhances the research potential of SDI-812/H.

Seasonality determinations play an important role in describing settlement organization. Prehistoric and historic deposits at SDI-812/H contain cultural remains that can be used for seasonality determinations, including macrofloral remains, otoliths and other fish bone, and shell.

*Trade and Exchange*

It was noted earlier that the presence of a major spring made Los Flores attractive to settlers and travelers alike. Are artifacts of trade or exchange present at SDI-812/H? If so, what are the sources of the materials? Within the region, do they indicate exchange between coastal and interior groups? Is there evidence the site's inhabitants participated in the Channel Island interaction sphere? Is there evidence of trade or exchange with groups outside the region? Current analyses are preliminary but do not suggest the site contains a great deal of trade items. Only a small amount of the site has been tested, however, and larger samples and additional analyses of lithic materials, pottery, and historic artifacts from the site could provide important information on trade and exchange.

*Paleoenvironmental Reconstruction*

Historical, geomorphological, palynological, and archaeological data from coastal sites in Las Pulgas Canyon demonstrate significant variations in the paleoenvironment of Camp Pendleton (ASM Affiliates 1996). Temporal variations in sea level affected the types and availability of marine resources, while climatic fluctuations affected sedimentation rates, caused changes in the prehistoric and historic landscape, and affected the types and distribution of important plant communities. Despite the significance of the findings, the authors indicate that additional palynological and geomorphological sampling in the Las Flores/Las Pulgas drainage is absolutely necessary to document how the landscape, climate, flora, and fauna changed over the course of human occupation (ASM Affiliates 1996).

The numerous cultural and non-cultural strata at SDI-812/H indicate the site can yield important geomorphic data on the nature, timing, and duration of depositional, erosional, and stability episodes affecting the prehistoric landscape. For similar reasons, the site has the potential to yield important palynological data regarding spatial and temporal changes in the abundance and availability of economically important floral and faunal resources. Since hunter-gatherer mobility strategies are determined in large part by the distribution of critical resources, such data are essential to understanding Camp Pendleton's prehistoric record.

*Native American Heritage Values*

SDI-812/H has the potential to be of heritage value to Native Americans. Ethnohistoric data indicate the Luiseño/Juaneño village of *Huisme* was located in the Las Flores/Las Pulgas drainage. Mr. David Belardes, former Chairman of the Juaneño, considers SDI-812/H a part of the village territory, a statement based on his family's long history of occupation within the region and statements made by his grandparents who once farmed the Las Flores/Las Pulgas drainage (1995,

personal communication). In addition to ethnohistoric sources, archaeological data suggest the drainage contains Late Prehistoric residential sites and cemeteries which could be ancestral to the Luiseño/Juaneño. Native Americans will be given the opportunity to review this report and comment on the heritage value of the site.

**Eligibility Recommendation**

The foregoing summary has indicated that previously unevaluated archaeological deposits at SDI-812/H are considered eligible for inclusion in the NRHP:

- Loci A-E are considered significant at both the National and State levels in the area of **Social History and Native American Ethnic Heritage (National Register Criterion A)** because it "embodies the chronicle of events and social processes whereby native tribal communities were forced to adapt to the drastic changes incurred by the expansion of European and American hegemony" and it "symbolizes the efforts of the Luiseño to retain their autonomy despite Euro-American imperialism and colonialism". Radiocarbon dates and archival data conclusively indicate Native American occupation occurred as early as A.D. 1530 and as late as A.D. 1854. Earlier deposits could occur as well. Periods of significance include Late Prehistoric (A.D. 100-1769), Spanish/Mexican/Mission (A.D. 1769-1833), and Indian Pueblo (A.D. 1833-1854).

- Loci A-E are considered significant at both the National and State levels in the area of **Prehistoric, Historic Aboriginal, and Historic Non-aboriginal Archaeology (National Register Criterion D)** for its potential to augment the archival record and address substantive research questions concerning Native American adaptations and activities during the Prehistoric, Mission, Indian Pueblo and American periods.

- The site as a whole can also be considered **a historic rural landscape significant under both Criterion A and D (National Register Bulletin #30:1-2).**

# Part III

# NRHP Evaluation of Archaeological Deposits at the Las Flores Adobe Ranch House, Locus B, CA-SDI-812/H

# 11 RESEARCH DESIGN

SAIC excavated 40 STPs and 14 square meters of excavated units in order to define the nature, structure, and research potential of the area to be affected by the proposed grading around the perimeter of the historic Las Flores Adobe Ranch House. The research design is based on general research questions proposed in *A Window to the Past* (Reddy and Byrd 1997) as well as site-specific questions offered by Rosenthal and Padon (1994) and SAIC (1996b).

## 11.1 PREHISTORIC AND ETHNOHISTORIC RESEARCH

### Chronology and Dating

The dearth of radiocarbon dates from Camp Pendleton sites severely hampers attempts to describe and explain prehistoric and ethnohistoric adaptations in the region. Radiocarbon dates that have been collected have been too few in number to establish fine-grained temporal controls over the sites in question. As a result, there is no local chronology, and the occupational history of the area is known only in the most general terms (e.g., Archaic, Late Prehistoric).

The archaeological deposits within the vicinity of the ranch house may be contemporaneous with the occupation of the ranch house, may be associated with a prehistoric or ethnohistoric occupation of the area pre-dating the construction of the adobe, or may be a combination of the two. No radiocarbon dates exist for Locus B of SDI-812/H. According to previous testing, historic and modern debris concentrate in the upper 20-30 cm, suggesting lower deposits represent relatively intact material that may pre-date the Adobe's 1867 construction (SAIC 1996b). Establishing tight temporal control over the site's cultural and natural strata will allow research to address a wide range of topics, including culture history, subsistence orientation, settlement organization, and trade and exchange. A selected sample of pertinent research questions that potentially can be addressed at Locus B of SDI-812/H are listed below. They have been derived from Rosenthal and Padon (1994), SAIC (1996b) and SAIC (1991), among others.

- What chronological and cultural periods are represented at this locus: Late Prehistoric, Ethnohistoric, Historic, or a combination of periods?
- If a Late Prehistoric period occupation is identified, does it appear to reveal continuity with the Ethnohistoric period?
- If an Ethnohistoric occupation is found, is there any evidence for a chronological break between this occupation of the area and the construction of the adobe ranch house?
- If an Ethnohistoric occupation is located, does it confirm or contradict ethnohistoric reconstructions of Native American lifeways during this period?

### *Data Requirements and Methodology*

Absolute dates for stratigraphically intact archaeological deposits were derived from radiocarbon analysis of marine shell; however, there is a problem with differentiating an Ethnohistoric occupation because the period of occupation is short and very late in time, which means that absolute dating techniques may not be precise enough to characterize these deposits. In this case, the standard deviation of the dates is greater than the length of the ethnohistoric occupation. Relative dating techniques, therefore, are very important for this project. Relative indicators include stratigraphic superposition and the identification of temporally diagnostic artifacts such as ceramics, metals, glass beads, projectile points, Euroamerican materials, and domesticated animal remains.

### Settlement Patterns

Many recent studies of prehistoric settlement and subsistence in California have focused on documenting and explaining the development of complex Native American cultures in coastal areas. For the Camp Pendleton area, early Spanish accounts and ethnographic sources suggest ethnohistoric and historic occupation by the Luiseño and Juaneño was characterized by relatively high population densities and occupation of permanent villages, each of which owned and defended a bounded territory with specific hunting, collecting, and fishing areas. Distant resources may have been procured by special task groups, but seasonal dispersal into small family groups may have been practiced at some times and places. Although it is generally recognized that such a complex system arose from a much earlier foraging pattern, the nature and changing dynamics of prehistoric adaptation in the Camp Pendleton area are poorly understood (Reddy and Byrd 1997). Even the most basic research questions remain to be addressed at most sites.

Binford's (1980, 1982) distinction between forager and collectors has proved to be a powerful heuristic device for investigating the processes by which prehistoric hunter-gatherers adapted to their environment. Binford's basic proposition is that the organization of resource procurement can be characterized as a continuum of logistical complexity ranging from simple foraging to more complex collecting strategies. Binford suggests that foraging and collecting strategies represent alternative solutions to different problems associated with the temporal and spatial availability of critical resources. Foraging strategies involve the movement of consumers to resources through residential moves, a logistically simple strategy that is successful only where all critical resources are located within the general area of the camp (the "foraging radius"). At the more complex end of the logistical continuum is the collecting strategy. Rather than acquiring resources by moving the residential group from one resource patch to another, collectors move resources to the consumers. Collector groups are characterized by relatively permanent camps and the use of small, specially organized work parties to collect distant resources, a necessary strategy when distributions of critical resources are not congruent:

> Under conditions of spatial incongruity . . . a residential move will not solve the problem. A move toward one location reduces access to the others. It is under this condition that a logistical strategy is favored (Binford 1980:15).

Binford's model is archaeologically useful because foraging and collecting strategies tend to generate different types of archaeological sites that in principle can be distinguished by varying combinations of manufacturing, extraction, maintenance, and processing activities (e.g., Bamforth

1984; Brian F. Mooney Associates 1994; SAIC 1991). A pure foraging strategy should produce only two types of sites: *residential bases*, where a group actually lives, and *locations*, where resources are obtained. A collecting strategy produces these two types of sites and also produces *field camps*, where special task groups reside while they are on logistical forays, *stations*, where such groups gather information on the surrounding region (e.g., a hunting stand), and *caches*, temporary storage places for abundant, bulky resources that cannot be efficiently transported to the residential base. Binford (1980) emphasizes that the distinction between foraging and collecting is a continuum rather than a dichotomy and a single group can utilize a mix of foraging and collecting strategies.

It is important to emphasize that site type definitions should not be viewed as a rigid set of rules for interpreting the archaeological record. Rather, site types are useful organizing devices that direct our attention to important aspects of human behavior that have archaeological implications. The goal of settlement and subsistence studies is not to identify rigid site types nor is it to classify the prehistoric inhabitants as foragers, collectors, or some combination of the two, but rather to understand what the people did and why they did it.

There are three current models of prehistoric subsistence and settlement that can be applied to the Camp Pendleton region, including those by Shipek (1977), True and Waugh (1982), and Graham (1981). Shipek (1977) suggests that during ethnohistoric times the Luiseño occupied permanent villages in a variety of ecological zones and made seasonal forays to procure specific resources from particular localities. If true, then the coastal area of Las Flores Creek could contain permanent villages as well as seasonal camps established by inland groups. Floral and faunal assemblages from permanent or semi-permanent residential sites should be relatively abundant, diverse, and indicate exploitation of local as well as non-local resources. Seasonality data should indicate year-round occupation. In contrast, subsistence remains from seasonal camps should be relatively less abundant, less diverse, and indicate a focus on local resources, particularly those that are either available or most abundant during specific seasons.

True and Waugh (1982) describe a diachronic model of settlement and subsistence change during the Late Prehistoric period of Luiseño occupation. They suggest that settlement patterns during the San Luis Rey I period (A.D. 1 to A.D. 1500) are characterized by small, briefly occupied campsites located in a variety of locations, a classic indication of what is now called a foraging strategy. After A.D. 1500 (San Luis Rey II), they suggest settlement patterns became more territorial, focused on specific drainages, and reflect a collector-oriented strategy. Sites included permanent villages in the western foothills and permanent summer camps in the mountains.

Graham's (1981) model was proposed for Late Prehistoric Kumeyaay rather than Luiseño but the fusion-fission dynamics of his model are relevant here. In his study area, he sees population aggregation in the mountains during summer and autumn to collect and store seasonally available grass seeds and acorns. Aggregation gives way in the winter as small groups move to the desert to forage for patchier, less abundant resources (Brian F. Mooney Associates 1994: 318). This model suggests that Late Prehistoric groups practiced collecting as well as foraging strategies in response to seasonal variations in resource abundance and availability.

To address the applicability of such models, settlement pattern research must address basic questions regarding site structure complexity; the density and diversity of site constituents; evidence of seasonality; and site locations (e.g., Brian F. Mooney Associates 1994; Reddy and Byrd 1997; SAIC 1991).

Recent investigations at SDI-812/H (SAIC 1996b) have demonstrated the potential of the site to contribute to the study of settlement organization during the ethnohistoric and historic periods. Locus B, in particular, may provide information about settlement change because Locus B may contain intact deposits pre-dating the construction of the ranch house. It may be possible to study how settlement during a pre-Adobe occupation of the site area may have changed with the onset of Adobe-period ranching activities. Locus B may also contain subsurface historic features that were once associated with the adobe ranch house, but are no longer recognizable from the surface, including remnants of the outhouses, mess hall wing, water tower, and corrals.

- If a Late Prehistoric or Ethnohistoric component is identified, what settlement type does it represent?
- Was the area used seasonally or year-round?
- If multiple components exist, is there evidence for increased sedentism in the more recent settlement?
- How did European contact change the settlement systems of the indigenous people?
- If a Late Prehistoric or Ethnohistoric component is identified, does the area appear to have been abandoned before the Adobe was constructed?

***Data Requirements and Methodology***

Settlement organization among hunter-gatherers is largely a reflection of mobility strategies that can be defined in terms of *kinds* of mobility (residential versus logistical) and *degree* of mobility (how often someone moves). Kinds of mobility are represented at a site by the nature, range, and diversity of (1) extractive, processing, manufacturing, and maintenance activities conducted at a site and (2) resources procured and habitats exploited. The degree of mobility or duration of occupation can be determined from (3) seasonal indicators in the floral and faunal assemblages, (4) the abundance (density) and diversity of archaeological materials and features, and (5) site structure complexity (size, depth, stratification, spatial segregation of activities, and the location and type of features). Data requirements include intensive analyses of representative samples of floral and faunal remains, functional studies of lithic and ceramic materials, and characterization of site structure.

Representative samples of flaked stone debitage were characterized in terms of raw material, reduction strategies, stages of production, tools produced, and the degree of refinement.

Ceramic artifacts were examined macroscopically and under low power magnification. Paste was examined in terms of amount and diversity of mineral inclusions, degree of angularity, and temper. Rim characteristics and surface treatments were documented. The assemblage was characterized in terms of abundance, vessel functions (e.g., jar, bowl, etc.) and diversity.

Variations in site structure and its complexity in hunter-gatherer adaptations parallel variations within the forager-collector continuum (O'Connell 1987, SAIC 1991: 263-306). That is, the structure of a site is a manifestation of the settlement-subsistence system at a particular location. Foragers tend to produce relatively simple, undifferentiated patterning, whereas collectors tend to produce more complex sites. Factors contributing to these differences include (1) duration and

intensity of site use, (2) range of activities performed (degree to which activities are spatially segregated), and (3) location and type of facilities (i.e., features) present. Characterization of vertical and horizontal distributions of archaeological and natural materials provides the basis for identifying site structure. However, numerous factors can affect the original structure of a site, including such post-depositional processes as erosion, colluviation, bioturbation, and recent human modification (e.g., plowing and grading). The analysis of site structure at Locus B of SDI-812/H, therefore, examines horizontal and vertical distributions and post-depositional processes in order to address the three factors noted above.

**Subsistence Orientation**

Reconstructing subsistence practices at a site is a necessary precursor to describing and explaining mobility strategies and settlement organization. Recent work at nearby sites indicates significant variability in resource use and habitat exploitation over time (ASM Affiliates 1996, 1997), but further excavations and analyses are needed before subsistence patterns can be reliably identified and described in terms of temporal, seasonal, or logistical factors. The presence of high densities of shell (mostly *Donax*) and moderate densities of bone (mostly cow, rabbits, and bird) can address a wide variety of research questions regarding resource use, habitat exploitation, and seasonality:

- What specific floral and faunal resources are represented at this site? Is there evidence of storable resources such as seeds or acorns? Is there evidence of a maritime fishing economy?
- What habitats were exploited? Were these all available in the immediate vicinity of the site or were other ecological zones, particularly inland areas, exploited?
- Does resource use and habitat exploitation suggest foraging or logistically based collecting?
- Was coastal exploitation seasonal or year-round?
- Is there evidence of temporal changes in resource use, especially with the introduction of European farming and herding methods?
- If an Ethnohistoric occupation exists, does it confirm or contradict ethnohistoric reconstructions of Luiseño diet and resource exploitation during this period?
- What trends are evident when comparing Locus B of SDI-812/H to other nearby sites?
- Can temporal and spatial variations be explained by seasonal changes in resource availability, changing environmental conditions such as loss of estuarine habitats during rising sea levels, or changes in resource procurement goals, duration of occupation, or settlement organization?

***Data Requirements and Methodology***

Representative samples of faunal assemblages from Locus B of SDI-812/H were collected, sampled, speciated, and described in terms of counts, weights, densities, and richness values. These data were used to discuss dietary emphasis in terms of the relative contribution of different taxa, habitat use, and evidence of seasonality. To address intrasite and intersite variability, the

analysis incorporated to the extent feasible data and interpretations from previous excavations at SDI-812/H and nearby sites.

**Trade and Exchange**

The presence of a major spring made Las Flores Creek area attractive to settlers and travelers alike. In addition, it is likely that territorial ownership rights, documented by the ethnohistoric model of Bean and Shipek (1978), developed during the Late Prehistoric period, concomitant with an increasingly logistical strategy of settlement and subsistence. Further, it is likely that territoriality resulted in decreased mobility, more formalized exchange networks, and a narrower range of exchange partners. Through time, this should be reflected by greater reliance upon locally available resources, such as Piedra de Lumbre chert and local clay sources, decreased diversity of non-local raw materials, and possibly the presence of finished artifacts known to have been used as trade goods (e.g., serpentine from Catalina Island). Finally, trade and exchange networks established during the Late Prehistoric and/or Ethnohistoric times may have been severed during the period of Missionization. If Locus B represents deposits from both pre-Contact as well as Historic periods, changes may be seen in the density and diversity of types of trade material over time.

- Are artifacts of trade or exchange present at SDI-812/H? If so, what are the sources of the materials?
- Within the region, do they indicate exchange between coastal and interior groups?
- Is there evidence the site's inhabitants participated in the Channel Island interaction sphere? Is there evidence of trade or exchange with groups outside the region?
- Are there differences in the density and diversity of trade material over time?

***Data Requirements and Methodology***

Previous work at the site indicates that limited evidence of trade and exchange may be found in the lithic and ceramic assemblages at Locus B (SAIC 1996b). Although lithic materials and pottery are present at the site, the limited comparative data available from other sites on Camp Pendleton will hamper interpretations.

## 11.2 HISTORIC PERIOD RESEARCH

Data supplied from archival research, along with the results obtained by Schaefer (1992), suggest a number of research questions pertinent for Locus B, the area around the Las Flores Adobe Ranch House.

Archival descriptions for the nearby *Estancia* describe a complex that contained a cattle ranch with an upgraded chapel and some liturgical facilities. Other features would have included granaries, a well, and storage facilities (Schaefer 1992: Section 8, Pg 2; 17). Prior to the establishment of the *Estancia,* mention was made of a *casco* or shelter where cattle were kept. Mention is also made of gardens that were scattered throughout the valley, cultivated by Indians (Robinson 1969). Locus B site area may have contained some of these features before the ranch house was constructed.

Specific questions relating to chronology, settlement patterns, and acculturation can potentially be addressed through this investigation.

**Chronology**

Three historic periods are recorded for SDI-812/H, including the Spanish, Mexican, and American period. These periods overlapped and altered traditional Luiseño settlement patterns. Each period brought with it differences in technology, changes in subsistence patterns, and availability of new tool types. The extent these differences are reflected in the artifact assemblage must be documented through careful analysis of all recovered historic artifacts, along with documentation of changes in the prehistoric assemblage (e.g., continuation of traditional patterns, use of non-native materials for traditional artifacts). Time differences from the Spanish contact to Mexican rule to American settlement reflects less than 100 years.

- Are there changes in the artifact assemblage that are reflective of these short time periods?
- How does the assemblage differ between the Spanish to Mexican to American periods? What would be considered "type" artifacts?
- Is there a demonstrable stratigraphic separation between historic and traditional artifact assemblages?

*Data Requirements and Methodology*

Two lines of inquiry regarding component differentiation were addressed. The first examined horizontal artifact and feature distribution patterns. This analysis determined if prehistoric and historic period activity areas could be defined and, if so, whether they overlap or are mutually exclusive. The second line of inquiry focused on the vertical distribution of Euroamerican and lithic artifacts.

**Settlement Pattern/Community Function**

The changing role SDI-812/H played through time may have influenced the degree to which various resources and technologies were used. Archaeological deposits may include evidence of Luiseño prehistoric village settlement patterns (hunting/gathering) as well as contact period activities that included farming and cattle ranching.

- Can changes to the physical landscape, use of specific resources, and/or changes in the settlement pattern be correlated to the historic time periods?
- How did the subsistence base at Las Flores shift through time?
- How did the introduction of Euroamerican agricultural practices such as cattle grazing alter the traditional residential patterns as reflected at SDI-812/H?
- If a change occurred, can it be documented through changes in artifacts types, particularly the increase of Euroamerican tools along with the modification of traditional technology?

*Data Requirements and Methodology*

Research goals focused on determining both horizontal and vertical differences in the artifact patterns for the prehistoric and historic assemblages. Research in the faunal and floral assemblage was used to help define any differences in either the horizontal or vertical distribution pattern. For example, faunal analysis of butchering marks on bones could determine if the marks were made by a metal or stone tool. The distribution of items with different types of butchering may assist in identifying discrete occupational deposits.

**Ethnicity/Acculturation Process**

The direction and extent of acculturation and adaptation may be reflected in the changes in technology, subsistence patterns, and use of the landscape. The coexistence of Native American and Euroamerican cultural materials offers a unique set of research questions. Perhaps the acculturation process was dominated by a trend toward adoption of non-indigenous technology by the Native American population. It would have been restricted by the availability of Spanish, Mexican and/or American goods, which was dependent on the economic development of the *Estancia* and rancho. Mission records, however, suggest that a number of ranchos and missions encouraged the production of Native American brownware pottery and continued use of stone tools.

- How were imported materials integrated into an existing prehistoric typology (e.g., glass for shell beads; projectile points made from wine bottles; use of white wares and ceramics over traditional brownwares)?

- To what degree did indigenous technological methods persist into the Historic Period?

*Data Requirements and Methodology*

Analysis of historic artifacts addressed the issue of replacement. Horizontal and vertical distributions of both Indian and Euroamerican cultural remains were examined to determine whether items such as tile, nails, glass, ceramics, and other nineteenth century manufactured artifacts were used by Native Americans.

## 11.3 NATIVE AMERICAN HERITAGE VALUES

Because the Las Flores vicinity is thought to be the traditional territory of the Luiseño *Howak* lineage, and the Juaneño people also claim this area, every attempt will be made to identify any feature or artifact that may reflect traditional values for both groups.

# 12 FIELD AND LABORATORY METHODS

The field and laboratory methods for the excavations at SDI-812/H were designed to define the nature, structure, and research potential of the area around the perimeter of the historic Las Flores Adobe ranch house. The excavation strategy was designed to ensure the acquisition of representative samples of the spatial and temporal variability inherent in the site area in order to address the various research questions outlined in the previous chapter.

## 12.1 FIELD INVESTIGATIONS AT LOCUS B OF SDI-812/H

### Mechanical Auger Holes

Forty auger holes were mechanically augered to determine the extent and structure of subsurface deposits in order to assist in the placement of the excavation units. The augers measured 24 cm in diameter and were excavated to a maximum depth of 95 cm. Excavation in discrete levels was not possible due to the limitations of the screw-auger. The majority of the augers were placed 10 meters apart along four transects running parallel to the northwest wall of the ranch house (see Figure 13-1). The rest of the auger holes were placed judgmentally along the other walls of the ranch house.

Augers holes were excavated until sterile sediment was encountered, and the soil from each hole was water-screened through 1/8-inch hardware mesh. All cultural material was collected, bagged, and brought to the Santa Barbara office of SAIC for laboratory identification and analysis. Field Auger forms were prepared, which included provenience location, information on soil type, color, termination depth, and general observations.

### Excavation Units

Ten excavation units, including four 1x2 $m^2$ units and six 1x1 $m^2$ units, totaling a volume of 7.8 $m^3$, were hand excavated in order to determine the character, structure, and integrity of subsurface cultural deposits. Units 102, 103, 108, and 110 were placed near the northwest and southwest walls of the ranch house to determine whether or not the proposed construction grading would disturb intact cultural deposits. Units 101 and 104 were placed near augers that produced a high density of shell fragments and other cultural material. Unit 106 was placed near the location of a historic privy, according to archival data (Figures 1-4 and 13-1). Finally, Units 105, 107, and 109 were combined to form a 2 m x 2 m excavation area around a rock scatter. The results of the excavations will be discussed more fully in the following chapter.

The units were oriented north/south, with the datum in the northwest corner. In the absence of distinct stratigraphic layers, excavations were conducted in decimeter levels. Hand-excavations were conducted primarily with shovels, although breaker-bars and hand picks were employed in

some of the more compact areas. Trowels and other more precise digging tools were used in the rock scatter. Most units were excavated by a team of two archaeologists. The field director monitored the progress of the field crew and verified that excavation and documentation procedures were consistent throughout the entire project.

Excavated material was water-screened through 1/8-inch hardware mesh, and all cultural material was collected, bagged, and brought to the Santa Barbara office of SAIC for laboratory identification and analysis. Records were compiled for each unit excavated. At least one side wall profile was drawn for each excavation area, photographs were taken, and information was recorded on observed stratigraphy, signs of disturbance, soil descriptions, and Munsell soil color codes for each strata. No column samples were excavated due to the disturbed nature of the archaeological deposits.

**Documentation**

Documentation included standardized level and unit records, auger forms, and photographic records as well as the daily notes maintained by the field director supervising the fieldwork. The following describes in more detail the types of documentation used for this project.

- **Field Auger Form.** Provides information on the provenience and soil characteristics of the mechanical auger holes.

- **Field Unit Form.** Summarizes information on unit provenience, depth, volume, size, and content. Also includes the rationale for placement and termination of the unit.

- **Field Level Form.** In addition to standard provenience data, presents volumetric, stratigraphic, disturbance, and content information for an excavated level; lists point provenienced artifacts, photographs, and special samples associated with the level; includes a map of the level, if appropriate, showing larger constituents and/or horizontal stratigraphic differences.

- **Field Feature Form.** Provides comprehensive data on the location, shape, size, content, and other characteristics of an excavated feature; summarizes methods used to excavate the feature and lists any special samples collected.

- **Field Photographic Log.** Lists the location and subject of each photograph for a specific roll of film.

- **Field to Lab Inventory Form.** Provides a daily inventory of the cultural material recovered from the site; used to track material from the field in Oceanside to the laboratory in Santa Barbara.

Although most of these forms were completed by field crew members, the field director reviewed the records daily to ensure their completeness, accuracy, and consistency. Laboratory personnel then checked the documentation relative to the materials and special samples sent in from the field. This system of multiple reviews ensured that all documentation was rigorously examined and verified.

Photographs, both black-and-white prints and color slides, were used to document the overall site setting, stratigraphic profiles, features, and artifact concentrations. In addition, the field personnel used photographs to document evidence of disturbance and field methods.

## 12.2 LABORATORY METHODS

All of the cultural material recovered from SDI-812/H was brought back to the SAIC office in Santa Barbara for processing and analysis. The types of analyses performed on the material were designed to provide information necessary to address the research questions outlined in the previous chapter.

### Cataloging

After water-screening, the material was size sorted through 1/4-inch and 1/8-inch sieves and then rough sorted by the laboratory crew into one of the following 12 different class types: lithic material, groundstone, cobble tools, bone, shell, charcoal, botanical remains, fire-affected rock, ceramics, historic artifacts (e.g., glass, metal, tile), miscellaneous, or undifferentiated/unsorted. The lithic material was further sorted into biface, core, debitage, flake tool and projectile point categories. The lithic sub-categories were also separated by basic material type. The groundstone was differentiated by basic categories (e.g., mano, metate, mortar, pestle) and material type. Worked bone and shell were separated from the undifferentiated fragments. The historic and modern debris were separated by material type (e.g., glass, metal).

A catalog of the entire collection was created in the program *FileMaker Pro*, using a coding system developed for SAIC-derived artifact collections. The catalog includes provenience information, screen size, basic artifact descriptions (including signs of modifications), counts, weights, the initials of the cataloger, the date cataloged, and any additional comments.

### Lithic Analysis

The flaked stone assemblage was first separated into five basic categories: biface, core, debitage, flake tool, and projectile point. The items were then classified by material type. Dr. Sean Hess analyzed the formal tools and a subset of the debitage assemblage. The results of this analysis can be found in Chapter 6.

### Historic Artifacts and Tizon Brownware

Dr. Judy Berryman identified and analyzed the historic artifact assemblage and the Tizon Brownware fragments. The results of her analysis can be found in Chapter 7.

### Faunal Analysis

The vertebrate remains from the 1/4-inch and 1/8-inch screened mesh of the unit excavations was analyzed by Dr. Karen Rasmussen. The bone fragments were identified to the most specific taxonomic level possible. In addition, a record was kept on element type, siding, and signs of modification.

The laboratory crew identified the shell remains from the 1/4-inch screened mesh to the most specific taxonomic level possible, and all identifications were subsequently checked by Dr. Karen Rasmussen. The shell fragments were weighed and a minimum number of individuals (MNI)

count was derived for the entire assemblage. The results of the vertebrate and invertebrate analyses can be found in Chapters 8 and 9, respectively.

### Botanical Analysis

Due to the disturbed nature of the archaeological assemblage at Locus B, no samples were submitted for flotation and subsequent botanical analysis.

### Radiocarbon Dating

Three samples were submitted to Beta Analytic, Inc. for radiocarbon dating. The results of the radiocarbon dates are provided in the following chapter.

# 13 SITE STRUCTURE

## 13.1 SITE STRATIGRAPHY AND DISTURBANCE

Locus B of SDI-812/H is situated on a relatively high fluvial terrace that flanks the valley floor and floodplain. Soil profiles exposed during the initial testing of the locus (SAIC 1996b) and during current testing demonstrate the presence of a well-developed A horizon containing cultural material extending from the ground surface to depths ranging from 35 to 80 cm below the surface. The site has been plowed and in most units the A horizon is underlain by a mixed A/B stratum which is then underlain by a B horizon of hard clay. The generally high degree of soil development indicates that the landform at Locus B forms a stable surface that lacks the potential for buried deposits.

Natural and cultural processes affecting the integrity of archaeological sites often are recorded in the soil-geomorphologic record (Wood and Johnson 1978). Cultural disturbances generally include construction-related earth-moving activities, agricultural pursuits, livestock ranching, and off-road vehicle transportation. Natural processes affecting site integrity include erosion and pedoturbation (i.e., soil mixing processes). Pedoturbative processes within the study area are generally limited to bioturbation (i.e., biologically induced soil mixing).

Historic sources indicate that the area around the ranch house was plowed for agriculture until Louis Magee's retirement in 1962. Subsurface deposits have also been impacted by installation of irrigation lines and trees used for landscaping. Although no distinct "plowzones" were noted in the unit profiles during the current testing, it is assumed that much of the area around the ranch house has been affected by plowing and other agricultural practices. Subsurface disturbance and compaction of the substratum, including possible discing in the upper portions of the A horizon, was noted at Locus B during initial testing by SAIC (SAIC 1996b).

Signs of natural disturbances were present during excavations. The majority of the surface horizons displayed evidence of burrowing insects and roots. Open rodent burrows are present locally, with *krotovina* (filled burrows) common in the upper portions of the profiles.

A more detailed description of the geomorphology, along with selected soil profiles from SAIC's initial testing can be found in Appendix A and B of SDI-812/H's *Management Summary* (SAIC 1996b).

## 13.2 SITE STRUCTURE

Forty auger holes and ten excavation units were excavated during the current testing project in order to define the nature, structure, and research potential of the area around the perimeter of the

historic Las Flores Adobe Ranch House. A complete listing of the recovered cultural material is provided in Appendix D.

**Auger Holes**

Forty auger holes were mechanically augered to determine the extent and structure of subsurface deposits in order to assist in the placement of the excavation units. The augers measured approximately 24 cm in diameter and were excavated to a maximum depth of 95 cm. The majority of the augers were placed ten meters apart along four transects running parallel to the northwest wall of the ranch house (Figure 13-1). The rest of the auger holes were placed judgmentally along the other walls of the ranch house.

The cultural material recovered from the auger testing included shell, animal bone, flaked stone material, Tizon Brownware, glass fragments, corroded metal, historic ceramics, and modern debris. Table 13-1 provides a list of the cultural material, by weight, recovered from each auger hole.

The auger testing was used primarily to identify areas with high density or diversity of cultural material to highlight locations for future testing and hand-excavations. A few general statements, however, can be made about the site deposits at Locus B based solely on the material recovered from the auger holes. No auger hole was completely sterile, demonstrating that cultural material exists, albeit in varying densities, throughout the tested area surrounding the ranch house. The types of cultural material recovered suggest that Locus B may contain both prehistoric and historic occupational debris. In addition, the high frequency of modern debris suggests that there may have been a high degree of soil mixing in Locus B.

**Excavation Areas**

Ten units were hand-excavated to determine the character, structure, and integrity of the subsurface cultural deposits. Some of the excavation units were placed near augers with high densities of material to study the vertical distributions of artifacts. Other units were placed in areas scheduled for grading activities or in areas thought to contain historic features (i.e., privies).

Units 101 and 104 were placed near auger holes with high amounts of cultural material. Units 102, 108, and 110 were placed near the walls of the ranch house to determine whether or not the proposed construction grading would disturb intact cultural deposits. Unit 103 was placed two meters west of Unit 102 in order to try to avoid the pipes exposed in Unit 102. Units 102 and 103 are considered a single excavation area in the following discussions because of their close proximity to each other as well as the similar nature of their deposits. Unit 106 was placed near the expected location of a historic privy, according to archival data (Figures 1-4 and 13-1). Finally, Units 105, 107, and 109 were combined to form a 2 m x 2 m excavation area around a rock scatter. The density of cultural material by unit is given in Table 13-2.

***Units 101 and 104***

Units 101 and 104 are 1 m x 2 m units, placed near augers 103 and 102, respectively. The soil profiles of the two units are very similar in nature. Generally, soils were moderately compact until approximately 40 to 50 cm in depth. Below this depth an increase in clay content and compactness occurred, correlated with a decrease in cultural material below approximately 40 cm (Tables 13-3 and 13-4).

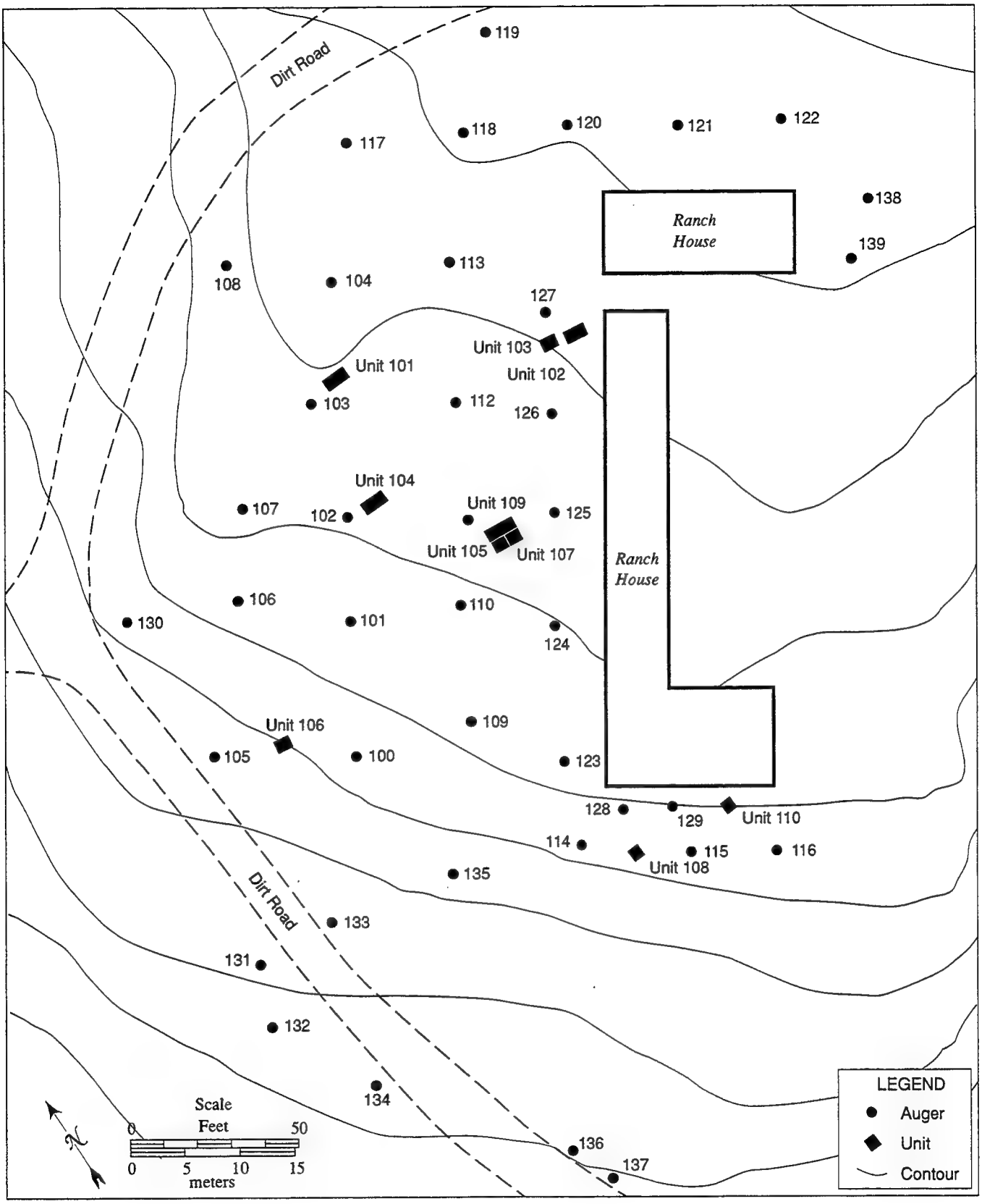



**Figure 13-1. Location of SAIC's 1998 Excavations Around the Las Flores Adobe Ranch House**

**Table 13-1. Cultural Material Recovered from the Mechanical Auger Holes**

| Auger | Depth (cm) | Shell (g) | Bone (g) | Flaked Stone (g) | Tizon (g) | Glass (g) | Metal (g) | Ceramics (g) | Modern[1] (g) |
|---|---|---|---|---|---|---|---|---|---|
| 100 | 52 | 0.1 | 0.1 | 2.2 | — | 0.9 | 0.1 | 2.3 | 0.4 |
| 101 | 62 | 1.2 | 0.9 | — | 1.7 | — | 1.2 | — | — |
| 102 | 75 | 220.8 | 2.2 | — | — | 0.2 | 12.3 | — | 0.6 |
| 103 | 65 | 28.4 | 0.3 | 9.2 | — | — | 0.2 | — | 0.1 |
| 104 | 70 | 25.5 | 0.1 | — | — | 6.2 | 11.0 | — | — |
| 105 | 80 | 0.1 | 1.0 | 0.1 | — | 1.4 | 1.2 | — | 0.4 |
| 106 | 62 | 0.9 | 1.4 | 7.3 | — | 0.9 | 2.4 | 2.3 | 0.1 |
| 107 | 68 | 2.7 | 4.3 | 46.9 | — | 0.7 | 11.1 | 0.9 | 0.3 |
| 108 | 90 | 0.7 | — | — | — | 8.2 | — | — | — |
| 109 | 66 | 0.3 | 0.2 | 0.6 | — | 0.3 | — | — | 1.4 |
| 110 | 60 | 20.9 | 0.1 | 1.0 | — | — | 2.3 | — | 0.4 |
| 111 | 72 | 41.0 | 0.3 | 0.6 | 0.7 | 0.8 | — | — | 0.1 |
| 112 | 60 | 17.5 | 1.7 | 3.3 | — | 1.0 | 244.9 | — | 182.2 |
| 113 | 85 | 3.8 | 0.4 | 3.4 | — | 4.9 | 9.9 | — | 0.2 |
| 114 | 49 | 0.3 | — | — | — | — | 3.1 | — | 1.9 |
| 115 | 71 | 2.0 | 0.6 | 1.0 | — | — | — | — | 3.7 |
| 116 | 32 | 6.7 | 1.1 | 13.4 | — | — | 2.8 | — | 12.2 |
| 117 | 60 | 18.3 | 0.5 | 8.0 | — | 3.5 | 1.6 | — | — |
| 118 | 68 | 1.6 | — | — | — | 1.0 | — | — | — |
| 119 | 75 | 0.7 | — | — | — | 1.9 | — | — | — |
| 120 | 50 | 1.3 | 0.1 | 5.2 | — | 0.7 | 7.4 | — | 2.0 |
| 121 | 95 | 0.9 | 0.1 | 0.2 | — | — | 25.6 | — | — |
| 122 | 95 | 0.1 | 0.3 | 14.7 | — | 0.1 | 1.3 | — | 3.1 |
| 123 | 83 | 0.5 | — | — | — | 2.6 | 0.4 | 1.2 | 0.7 |
| 124 | 55 | 0.7 | 0.4 | 0.1 | — | 1.7 | — | 8.4 | 0.1 |
| 125 | 45 | 3.6 | 0.1 | — | 9.8 | 0.6 | — | — | 0.6 |
| 126 | 76 | 47.4 | 0.2 | — | — | 3.3 | — | 18.3 | 20.0 |
| 127 | 95 | 0.5 | 0.2 | 13.9 | — | — | 0.8 | — | 0.6 |
| 128 | 82 | 43.2 | 0.9 | 109.5 | — | 2.0 | 3.9 | — | 2.8 |
| 129 | 90 | 9.6 | 3.7 | 1.5 | — | — | 0.3 | — | 6.7 |
| 130 | 87 | 0.5 | — | — | — | — | 1.4 | — | — |
| 131 | 74 | 1.1 | 5.9 | 1.1 | — | 7.5 | 14.3 | — | 0.6 |
| 132 | 95 | 1.0 | 2.7 | — | — | 13.5 | 2.1 | — | — |
| 133 | 64 | 3.6 | 2.1 | 0.1 | — | 6.3 | 18.7 | 0.8 | — |
| 134 | 90 | 0.3 | 0.2 | — | — | 0.4 | 16.3 | — | 0.1 |
| 135 | 44 | 3.5 | 1.0 | — | — | 7.3 | 275.9 | — | 7.7 |
| 136 | 85 | 0.3 | — | — | 0.7 | — | — | 0.3 | 1.0 |
| 137 | 38 | — | 0.3 | — | — | 1.7 | 0.1 | 4.9 | — |
| 138 | 90 | 76.3 | 2.3 | 30.4 | — | 7.1 | 2.7 | — | 0.1 |
| 139 | 95 | 0.4 | 1.7 | 0.4 | — | — | 19.5 | — | — |

*Note:* 1. Modern category includes construction material, plastics, and other miscellaneous modern debris.

**Table 13-2. Density of Cultural Material by Unit[1]**

| *Unit* | *101* | *102* | *103* | *104* | *105* | *106* | *107* | *108* | *109* | *110* |
|---|---|---|---|---|---|---|---|---|---|---|
| **ExcavatedVolume ($m^3$)** | 1.2 | 1.2 | 0.5 | 1.1 | 0.5 | 0.7 | 0.4 | 0.6 | 0.8 | 0.8 |
| **Prehistoric Artifacts** | | | | | | | | | | |
| Flaked Stone Tools($ct/m^3$) | 2 | 2 | 2 | 4 | 2 | 1 | - | - | 1 | 6 |
| Debitage($ct/m^3$) | 119 | 29 | 44 | 278 | 112 | 60 | 150 | 293 | 286 | 145 |
| Groundstone($ct/m^3$) | - | - | 2 | 2 | - | - | 3 | - | - | 1 |
| Tizon($ct/m^3$) | 13 | 2 | 2 | 46 | 4 | - | 3 | - | 11 | - |
| FAR($g/m^3$) | 873 | 323 | - | 2,096 | 2,850 | 252 | 571 | 3,650 | 1,445 | 2,719 |
| **Historic Material** | | | | | | | | | | |
| Glass($g/m^3$) | 40 | 36 | 20 | 9 | 18 | 612 | 31 | 32 | 19 | 230 |
| Ceramics($g/m^3$) | 22 | 35 | - | - | 3 | 3 | <1 | - | 3 | - |
| Metal($g/m^3$) | 129 | 905 | 295 | 39 | 46 | 1,833 | 621 | 98 | 231 | 244 |
| Tile/Brick($g/m^3$) | 42 | 129 | - | 2 | 2 | 316 | 26 | 44 | 300 | 67 |
| **Faunal Material** | | | | | | | | | | |
| Bone($g/m^3$) | 83 | 3 | 4 | 185 | 157 | 54 | 265 | 51 | 60 | 113 |
| Shell($g/m^3$) | 1,400 | 8 | 10 | 11,834 | 441 | 45 | 353 | 936 | 610 | 190 |
| **Modern Material[2]** | | | | | | | | | | |
| Modern ($g/m^3$) | 2 | 199 | 205 | 73 | 3 | 171 | 65 | 2 | 47 | 286 |

[1]*Densities rounded to nearest whole number.*

[2]*Modern category includes construction material, plastics, and other miscellaneous modern debris.*

**Table 13-3. Density of Cultural Material of Unit 101**

| *Unit* | *0-10cm* | *10-20cm* | *20-30cm* | *30-40cm* | *40-50cm* | *50-60cm* |
|---|---|---|---|---|---|---|
| **Excavated Volume ($m^3$)** | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| **Prehistoric Artifacts** | | | | | | |
| Flaked Stone Tools($ct/m^3$) | - | - | - | 10 | - | - |
| Debitage($ct/m^3$) | - | 315 | 205 | 165 | 25 | 5 |
| Groundstone($ct/m^3$) | - | - | - | - | - | - |
| Tizon($ct/m^3$) | 20 | 35 | 15 | - | 5 | - |
| FAR($g/m^3$) | 572 | 3,668 | 996 | - | - | - |
| **Historic Material** | | | | | | |
| Glass($g/m^3$) | 39 | 143 | 52 | 6 | - | - |
| Ceramics($g/m^3$) | 36 | 92 | 6 | - | - | - |
| Metal($g/m^3$) | 105 | 561 | 96 | 10 | - | - |
| Tile/Brick($g/m^3$) | 14 | 16 | 137 | 88 | - | - |
| **Faunal Material** | | | | | | |
| Bone($g/m^3$) | 21 | 409 | 54 | 10 | 2 | 2 |
| Shell($g/m^3$) | 241 | 3,207 | 3,623 | 1,257 | 71 | 3 |
| **Modern Material** | | | | | | |
| Modern($g/m^3$) | 3 | 8 | - | - | - | - |

*Note: Densities rounded to nearest whole number.*

**Table 13-4. Density of Cultural Material of Unit 104**

| *Unit* | *0-10cm* | *10-20cm* | *20-30cm* | *30-40cm* | *40-50cm* | *50-60cm* |
|---|---|---|---|---|---|---|
| **Excavated Volume ($m^3$)** | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 |
| **Prehistoric Artifacts** | | | | | | |
| Flaked Stone Tools($ct/m^3$) | - | 5 | 15 | - | - | - |
| Debitage($ct/m^3$) | - | 670 | 535 | 85 | 240 | - |
| Groundstone($ct/m^3$) | - | - | 10 | - | - | - |
| Tizon($ct/m^3$) | - | 190 | 40 | 5 | 10 | - |
| FAR($g/m^3$) | - | 4,020 | 2,603 | 4,905 | - | - |
| **Historic Material** | | | | | | |
| Glass($g/m^3$) | 21 | 5 | 16 | 1 | 9 | - |
| Ceramics($g/m^3$) | - | - | - | - | - | - |
| Metal($g/m^3$) | 64 | 64 | 71 | 15 | - | - |
| Tile/Brick($g/m^3$) | 12 | - | 2 | - | - | - |
| **Faunal Material** | | | | | | |
| Bone($g/m^3$) | 15 | 670 | 196 | 99 | 35 | 2 |
| Shell($g/m^3$) | 526 | 27,499 | 17,657 | 13,167 | 5,992 | 498 |
| **Modern Material** | | | | | | |
| Modern($g/m^3$) | 303 | 53 | 2 | 45 | - | - |

*Note: Densities rounded to nearest whole number.*

A soil profile drawn for Unit 101 (Figure 13-2) is representative of both Units 101 and 104. Stratum I (0 to approximately 35 cm) is an A horizon soil with a high content of cultural material. The soil consisted of brown, damp, moderately compacted, fine-grained, silty sand containing few pebbles (Munsell 10 YR 4/3). Stratum II (35-40 cm) is an A Horizon with some mottling of the underlying B horizon soils from bioturbation and plowing. The soils consisted of moist, moderately compacted, yellowish-brown, fine-grained, silty sand again with few pebbles (Munsell 10 YR 5/4). Stratum III (40-50 cm) and Stratum IV (50-60 cm) are B Horizons soils, the latter of which contains primarily hard compacted clay. Stratum III consisted of compact, brown, medium-grained sand with rounded pebbles and mottling of clay (Munsell 7.5 YR 5/4). Stratum IV (50-60 cm) was light yellowish-brown, hard-compacted sandy clay. In both Units 101 and 104, rodent disturbance was clearly evident by the presence of *krotovina* (filled rodent burrows) through all of the strata, including the hard clay of Stratum IV (Figure 13-2).

Most of the cultural material is concentrated within the 10-40 cm levels (Tables 13-3 and 13-4) and exhibit unimodal distributions that peak in the 10-20 cm level and declines with greater depth. Cultural material was, for the most part, confined to the A horizon. Some material has trickled down to lower stratigraphic layers; however, the material recovered from the lower reaches were usually associated with A soils that had mottled into the lower B horizon strata. The fact that debitage, Tizon pottery, and glass exhibit secondary peaks in the 40-50 cm level of Unit 104 is probably due to bioturbation and/or plowing. Overall, Units 101 and 104 contained higher densities of shellfish than any other excavated area (Table 13-2). Unit 104 had relatively high levels of prehistoric material and faunal remains, but relatively low densities of historic material. Unit 101 had moderate levels of both prehistoric and historic material. Modern material was recovered to 20 cm in depth in Unit 101 and 40 cm in depth in Unit 104.

*Units 102 and 103*

Units 102 and 103 were located near the northwestern corner of the ranch house (Figure 13-3). Unit 102 was excavated first. Soil in this unit was extremely soft and loose because it had been disturbed by construction of two metal pipes found in the 20-30 cm level. The first pipe was ten centimeters in diameter and was situated in the northwest corner of the unit. The second pipe was five centimeters in diameter and was located in the southeast corner of the unit. At approximately 60 cm in depth, the water table was encountered and the excavation was terminated. Rodent disturbance (*krotovina*) was prevalent down to the 40-50 cm level. Overall, the soil excavated from Unit 102 appeared to be imported fill. Unit 103 was excavated in order to determine whether the imported fill located around the pipes of Unit 102 extended further to the west. Although no pipes were uncovered in Unit 103, the soil profile also appeared to be fill.

Two strata were identified for Unit 103 (Figure 13-4). Stratum I (0-40 cm), an A horizon soil, consisted of lightly compacted, dark grayish brown, sandy clay with small sized grain texture (Munsell 10 YR 3/2). Stratum II (40-50 cm), a B horizon soil, consisted of hard, compacted, yellowish-brown, sandy clay with moderate sized grain texture (Munsell 10 YR 3/3). Only Stratum I was encountered in Unit 102.

Units 102 and 103 are composed of re-deposited fill; therefore, the vertical distribution (Table 13-5) of the cultural material is disturbed and highly suspect. Overall, the units contained primarily historic artifacts and construction debris, but interpretation of this material is hampered because it originated from a disturbed context.

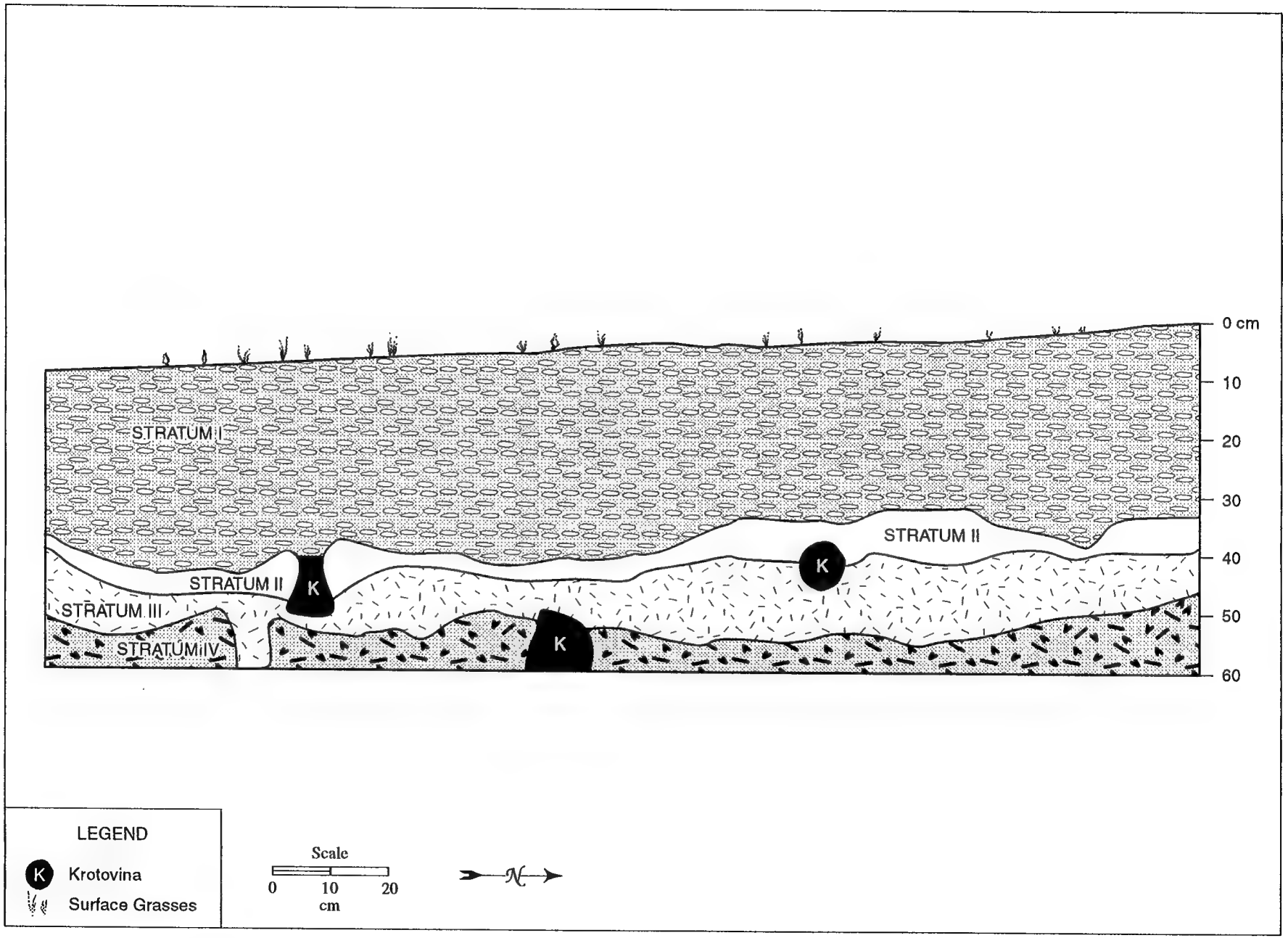



**Figure 13-2. West Wall Profile of Unit 101 Displaying Stratigraphic Layers**

**Figure 13-3. Excavating Unit 102 Near the Northwestern Corner of the Ranch House**

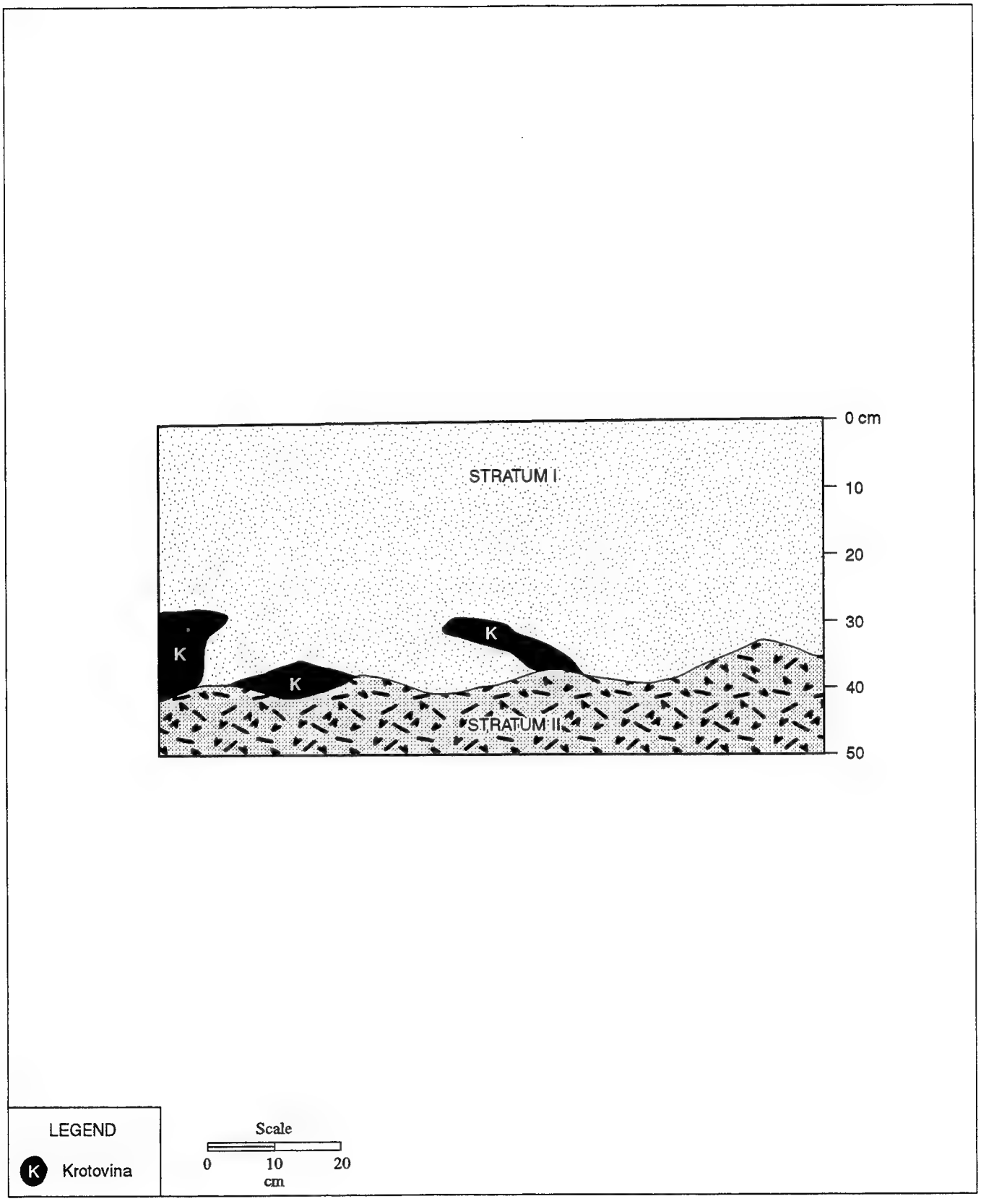



**Figure 13-4. North Wall Profile of Unit 103 Displaying Stratigraphic Layers**

**Table 13-5. Density of Cultural Material of Units 102 & 103**

| *Unit* | *0-20cm* | *20-30cm* | *30-40cm* | *40-50cm* | *50-60cm* |
|---|---|---|---|---|---|
| **Excavated Volume ($m^3$)** | 0.6 | 0.3 | 0.3 | 0.3 | 0.2 |
| **Prehistoric Artifacts** | | | | | |
| Flaked Stone Tools($ct/m^3$) | - | - | 3 | 3 | 5 |
| Debitage($ct/m^3$) | 30 | 40 | 13 | 57 | 30 |
| Groundstone($ct/m^3$) | - | - | - | 3 | - |
| Tizon($ct/m^3$) | 2 | - | 3 | 3 | - |
| FAR($g/m^3$) | - | - | - | - | 1,936 |
| **Historic Material** | | | | | |
| Glass($g/m^3$) | 34 | 23 | 7 | 77 | - |
| Ceramics($g/m^3$) | 16 | - | 1 | 16 | 135 |
| Metal($g/m^3$) | 465 | 1,689 | 1,306 | 81 | 160 |
| Tile/Brick($g/m^3$) | 257 | - | - | - | - |
| **Faunal Material** | | | | | |
| Bone($g/m^3$) | 6 | 2 | 2 | - | - |
| Shell($g/m^3$) | 19 | 9 | 1 | 1 | 2 |
| **Modern Material** | | | | | |
| Modern($g/m^3$) | 204 | 579 | 99 | 52 | - |

*Note: Densities rounded to nearest whole number.*

***Unit 105, 107, and 109***

Unit 105 was a 1 m x 1 m unit placed near Auger 111. Excavations encountered a scatter of rock within a 10 cm level (between approximately 30 and 40 cm in depth) consisting of both angular rock and broken rounded cobbles. The rocks were primarily granitic and volcanic in origin and averaged about ten to fifteen centimeters in length. In order to determine if the rock formed some type of spatial patterning, an adjacent 1 m x 1 m unit (Unit 107) and then an additional 1 m x 2 m unit (Unit 109) were added to Unit 105 to form a 2 m x 2 m square excavation block (see Figure 13-1). Units 107 and 109 were excavated until the rock scatter was fully exposed (ca. 40 cm in depth), while Unit 105 was excavated down to 50 cm in depth at which time the sterile, hard-pan clay stratum was reached and excavations were discontinued.

Three strata were identified during the excavation of the units (Figure 13-5). Stratum I (0-20 cm) is an A horizon soil consisting of wet, moderately-compacted, dark grayish-brown sand with a fine-grained textured silt (Munsell 10 YR 4/2). Stratum II (20-40 cm) consisted of a mottled A and B horizon soil, and was composed of wet, moderately compacted, brown mottled sand with a fine-grained silt and ten percent gravels or pebbles (Munsell 10 YR 5/3). Stratum III (40-50 cm) consisted of a B horizon with hard compacted dark grayish-brown clay with some sand inclusions (Munsell 10 YR 4/2).

Although soil in Stratum I was soft and only moderately compacted, excavation was difficult due to heavy root disturbance from nearby trees. Some roots were over ten centimeters thick and transversed the entire length of the excavation area. The rock scatter was concentrated within Stratum II and was encountered throughout the 2 m x 2 m excavation area (Figure 13-6).

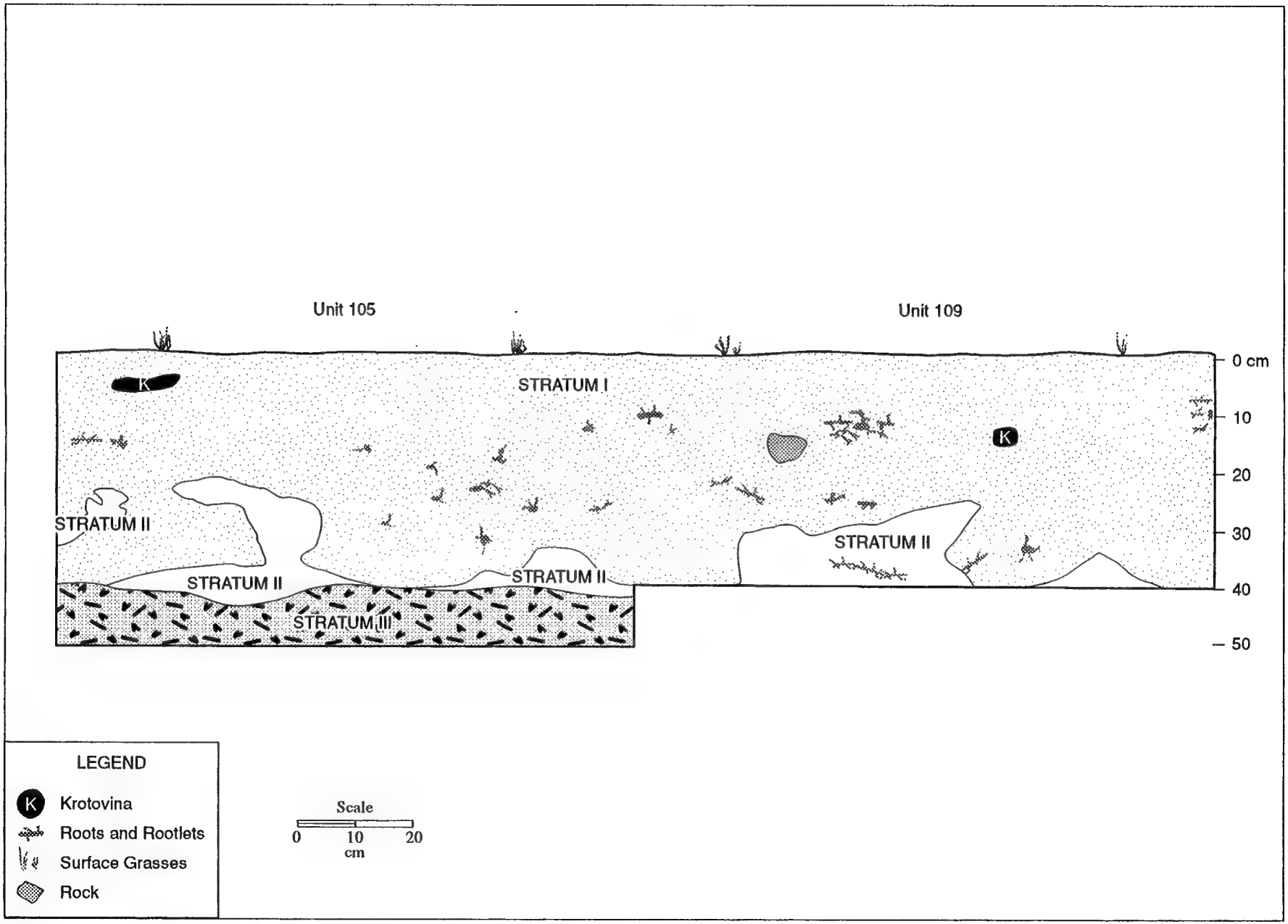



**Figure 13-5. West Wall Profile of Units 105 and 109 Displaying Stratigraphic Layers**

Most of the cultural material in the 2 m x 2 m area is concentrated in the 10-40 cm levels (Table 13-6) and exhibit unimodal distributions that peak in the 10-30 cm level and declines with greater depth. The fire-affected rock, however, peaks between 30-40 cm in depth. Modern material was recovered from every excavation level, but was concentrated in the 0-10 cm level. Overall, most of the cultural material was confined to the A horizon.

Although some flaked stone material (66 fragments) and fire-affected rock (1,425 g) were recovered from the same depths as the rock scatter, most of the rock in the scatter was unmodified. In addition, no spatial patterning was noted that might suggest the presence of a hearth, wall foundation, or other type of cultural feature. It is unlikely, however, that the rock scatter is a natural formation given the geomorphological history of the area. It is possible that the rock scatter represents some type of rock dump associated with plowing or construction activities. It is also possible, given the presence of lithic debris within the rock scatter, that the scatter represents a disturbed prehistoric feature.

A similar rock scatter was uncovered during SAIC's 1995 excavations at Locus B (see Chapter 5 of this volume). A scatter of whole and fractured angular rocks were uncovered between 20 and 30 cm in depth at Unit 30, which was situated east of the ranch house near the eastern boundary of Locus B. It was unclear to the investigators whether the unmodified rock scatter represented a cultural or natural formation based on only a 1 m x 1 m area exposure.

**Table 13-6. Density of Cultural Material of Units 105, 107, & 109**

| *Unit* | *0-10cm* | *10-20cm* | *20-30cm* | *30-40cm* | *40-50cm* |
|---|---|---|---|---|---|
| **Excavated Volume ($m^3$)** | 0.4 | 0.4 | 0.4 | 0.4 | 0.1 |
| **Prehistoric Artifacts** | | | | | |
| Flaked Stone Tools(ct/$m^3$) | - | - | - | 3 | 10 |
| Debitage(ct/$m^3$) | 123 | 203 | 365 | 160 | 50 |
| Groundstone(ct/$m^3$) | - | - | - | 3 | - |
| Tizon(ct/$m^3$) | 13 | 10 | 5 | 3 | - |
| FAR(g/$m^3$) | 623 | 288 | 2,551 | 3,563 | - |
| **Historic Material** | | | | | |
| Glass(g/$m^3$) | 21 | 32 | 35 | 2 | 3 |
| Ceramics(g/$m^3$) | 5 | 5 | - | <1 | - |
| Metal(g/$m^3$) | 189 | 518 | 229 | 203 | - |
| Tile/Brick(g/$m^3$) | 191 | 420 | 30 | 2 | - |
| **Faunal Material** | | | | | |
| Bone(g/$m^3$) | 72 | 288 | 167 | 54 | 3 |
| Shell(g/$m^3$) | 387 | 686 | 706 | 334 | 44 |
| **Modern Material** | | | | | |
| Modern(g/$m^3$) | 150 | 10 | 2 | <1 | 1 |

*Note: Densities rounded to nearest whole number.*

### *Unit 106*

Unit 106 was placed near the suggested location of a historic privy dating to the ranch house operations (see Figure 1-4), and excavations uncovered the highest densities of historic glass, metal, and tile/brick for the entire site (Table 13-2).

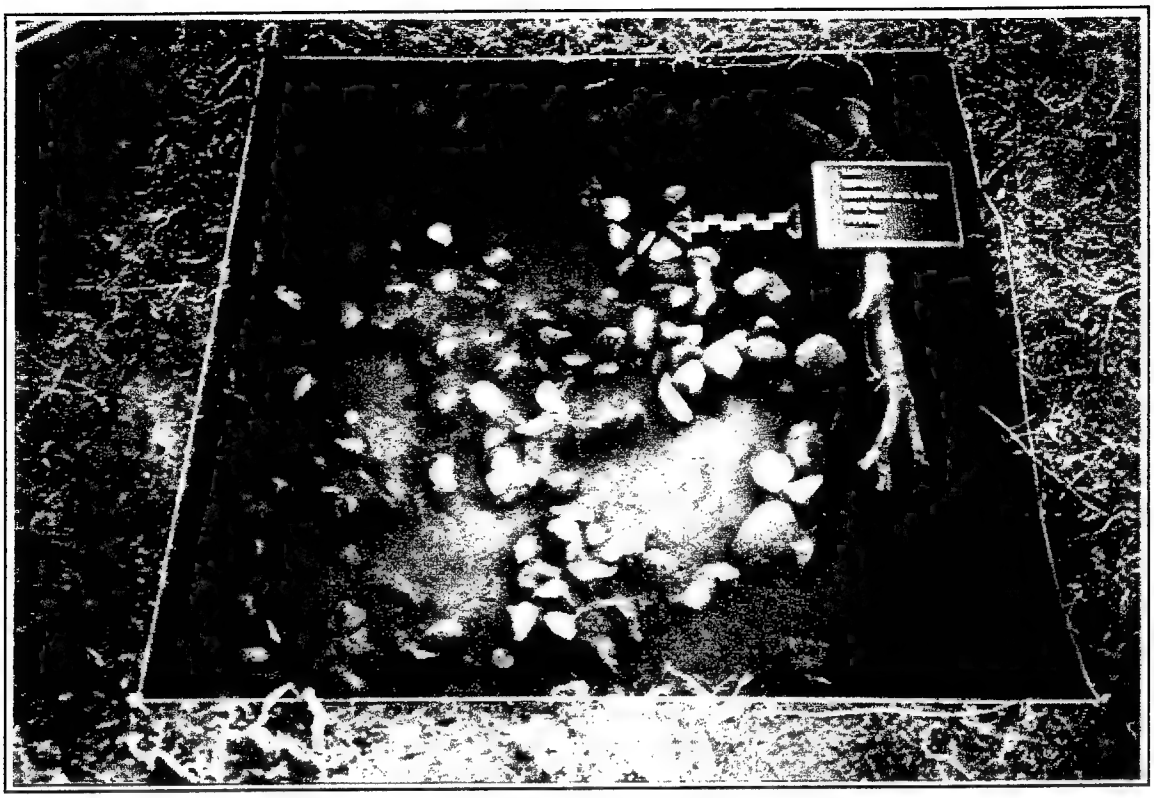


**Figure 13-6.**
**Overview of the Rock Scatter in Units 105, 107, and 109 at 40 cm Below the Surface**

Excavation of Unit 106 proceeded easily until a heavily compacted layer of clay was encountered within the 50-60 cm level. Signs of rodent soil mixing (*krotovina*) were evident down into the hard clay layer.

Three strata were encountered during the excavation of Unit 106 (Figure 13-7). Strata I (0-35 cm) is an A horizon soil consisting of lightly compacted, very dark grayish-brown sand with a few pebble inclusions (Munsell 10 YR 3/2). Strata II (35-55 cm) represents a mottled A/B Horizon consisting of lightly compacted, brown sandy soil mottled with the darker soil of Strata I (Munsell 10 YR 4/3). Strata III (55-70 cm) is a B Horizon consisting of moist, heavily compacted, dark grayish-brown sandy clay.

Most of the cultural material is concentrated in the 10-50 cm levels (Table 13-7) and exhibit unimodal distributions that peak in the 10-20 cm level and declines with greater depth. Fire-affected rock, historic ceramics, bone, and shell exhibit secondary peaks in the 30-40 cm level, but this is probably due to bioturbation. Modern material was recovered as far down as the 60-70 cm excavation level, but was concentrated in the 10-20 cm level. Material recovered from the lower depths of the unit probably filtered down from the upper A horizon soils through bioturbation and perhaps plowing.

**Table 13-7. Density of Cultural Material of Unit 106**

| *Unit* | *0-10cm* | *10-20cm* | *20-30cm* | *30-40cm* | *40-50cm* | *50-60cm* | *60-70cm* |
|---|---|---|---|---|---|---|---|
| **Excavated Volume ($m^3$)** | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| **Prehistoric Artifacts** | | | | | | | |
| Flaked Stone Tools($ct/m^3$) | - | 10 | - | - | - | - | - |
| Debitage($ct/m^3$) | - | 110 | 150 | 60 | 80 | 10 | 10 |
| Groundstone($ct/m^3$) | - | - | - | - | - | - | - |
| Tizon($ct/m^3$) | - | - | - | - | - | - | - |
| FAR($g/m^3$) | - | 864 | - | 898 | - | - | - |
| **Historic Material** | | | | | | | |
| Glass($g/m^3$) | 633 | 2,541 | 700 | 292 | 98 | 2 | 16 |
| Ceramics($g/m^3$) | - | 10 | 2 | 6 | 1 | - | - |
| Metal($g/m^3$) | 225 | 11,251 | 740 | 326 | 259 | 17 | 15 |
| Tile/Brick($g/m^3$) | 701 | 1,195 | 166 | - | 150 | - | - |
| **Faunal Material** | | | | | | | |
| Bone($g/m^3$) | 2 | 133 | 48 | 85 | 34 | 5 | - |
| Shell($g/m^3$) | 20 | 121 | 67 | 81 | 21 | 4 | 2 |
| **Modern Material** | | | | | | | |
| Modern($g/m^3$) | - | 1,193 | 1 | 1 | 1 | 1 | 1 |

*Note: Densities rounded to nearest whole number.*

### *Unit 108*

Unit 108 was located at the southwest corner of the ranch house structure. Like many of the units, Unit 108 was easily excavated because the soil was loosely compacted until a layer of clay was reached in the 40-50 cm level of the unit. A large root was encountered at the 30-40 cm level, along with an abundance of smaller roots throughout the unit making excavation difficult in places. A few scattered angular rocks, similar to those uncovered in Units 105, 107, and 109, were also

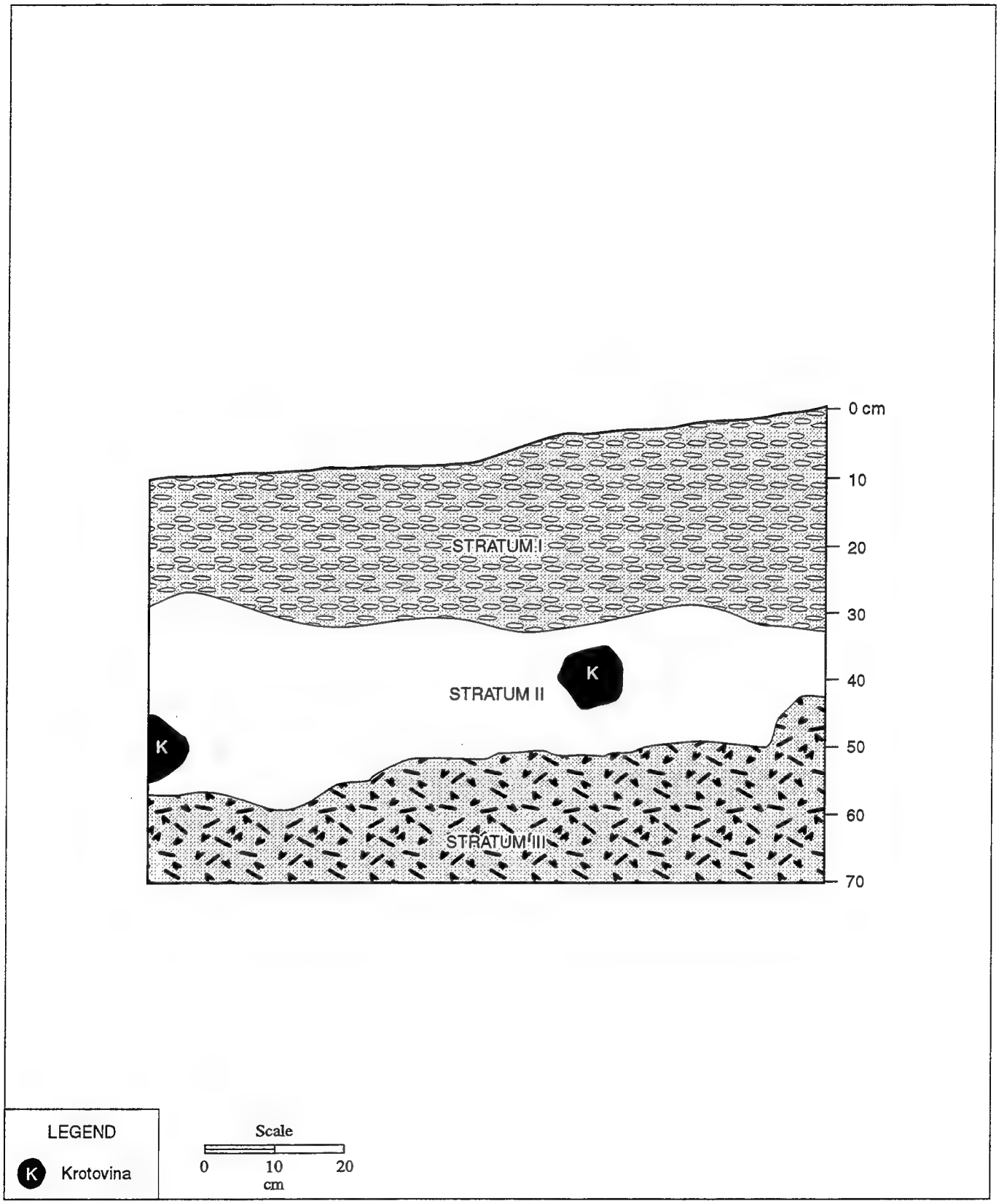



**Figure 13-7. North Wall Profile of Unit 106 Displaying Stratigraphic Layers**

encountered in the 30-40 cm level. It is possible that a large tree root in the same level has somewhat shifted the placement of the rocks.

The profile of the south wall of Unit 108 indicated the presence of two strata (Figure 13-8). Stratum I (0-40 cm) is an A horizon soil consisting of lightly compacted, very dark grayish-brown sandy loam (Munsell 10 YR 3/2). Stratum II (40-60 cm) is a mixture of the upper A horizon soils with a B horizon that was heavily disturbed by rodents and consisted of moist brown sandy clay with large pebble inclusions. Compaction of this sandy clay stratum increased from moderate to heavy compaction toward the lower depths of the deposit.

The highest densities of cultural material from Unit 108 were recovered between 10 and 40 cm in depth (Table 13-8). Most of the historic material peaked between 10 and 20 cm in depth, while there were high concentrations of fire-affected rock and shell between 30 and 50 cm in depth. Although a small amount of modern material was recovered at the bottom of the unit, the majority of the modern material was concentrated near the surface, between 0 and 10 cm in depth. The cultural material recovered from the lower reaches of the unit was probably the result of trickle-down due to bioturbation and possibly plowing.

**Table 13-8. Density of Cultural Material of Unit 108**

| *Unit* | *0-10cm* | *10-20cm* | *20-30cm* | *30-40cm* | *40-50cm* | *50-60cm* |
|---|---|---|---|---|---|---|
| **Excavated Volume ($m^3$)** | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| **Prehistoric Artifacts** | | | | | | |
| Flaked Stone Tools(ct/$m^3$) | - | - | - | - | - | - |
| Debitage(ct/$m^3$) | 30 | 360 | 710 | 530 | 130 | - |
| Groundstone(ct/$m^3$) | - | - | - | - | - | - |
| Tizon(ct/$m^3$) | - | - | - | - | - | - |
| FAR(g/$m^3$) | - | 1,020 | 3,555 | 15,316 | 2,009 | - |
| **Historic Material** | | | | | | |
| Glass(g/$m^3$) | 64 | 115 | 10 | - | - | - |
| Ceramics(g/$m^3$) | - | - | - | - | - | - |
| Metal(g/$m^3$) | 273 | 190 | 44 | 79 | - | - |
| Tile/Brick(g/$m^3$) | - | 247 | 16 | 3 | - | - |
| **Faunal Material** | | | | | | |
| Bone(g/$m^3$) | 34 | 63 | 110 | 85 | 12 | 3 |
| Shell(g/$m^3$) | 530 | 705 | 452 | 1,911 | 1,496 | 519 |
| **Modern Material** | | | | | | |
| Modern(g/$m^3$) | 11 | 1 | - | - | - | 1 |

*Note: Densities rounded to nearest whole number.*

### *Unit 110*

Unit 110 was located near the southwest corner of the ranch house. A two-inch metal water pipe was encountered at a little over 20 cm in depth, and part of the pipe was resting on a large rock (Figure 13-9). A section of a cut lumber board (probably a two-by-four) was also discovered in the 20-30 level just to the north of the pipe. At 80 cm, a STP was excavated in the center of the unit to locate the hard clay layer found in the bottom of the other units at the site, but only moderately compacted sand was encountered. Rodent disturbance (*krotovina*) was noted down to

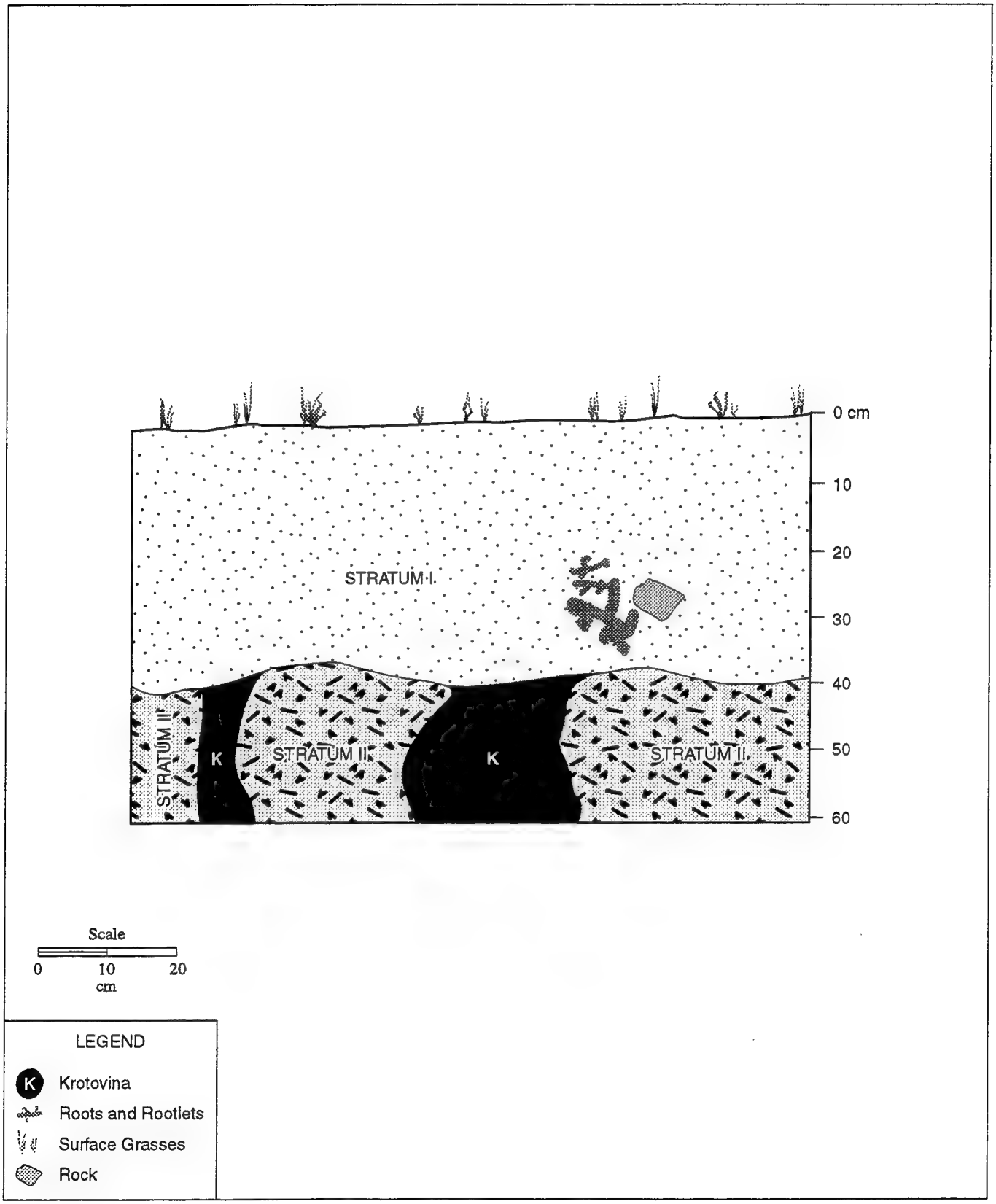



**Figure 13-8. South Wall Profile of Unit 108 Displaying Stratigraphic Layers**

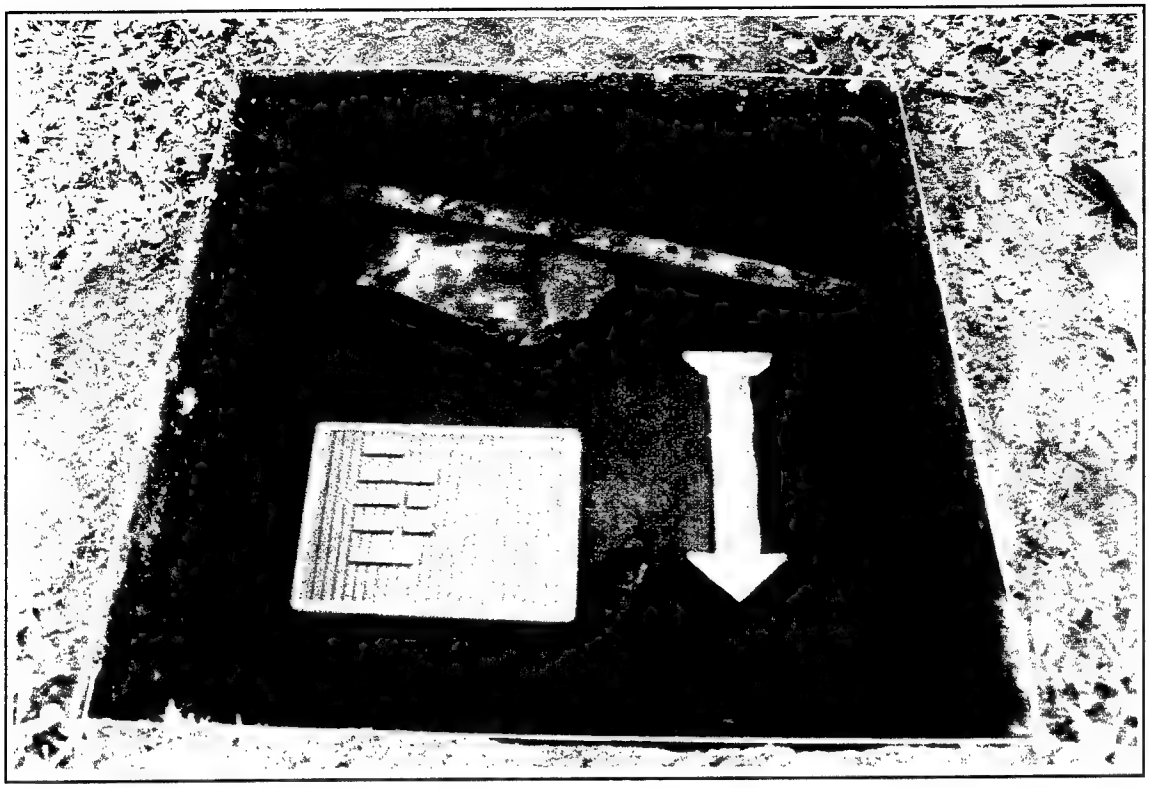


**Figure 13-9. Discovery of a Water Pipe in Unit 110**

approximately 65 cm in depth. Overall, the soil excavated from Unit 110 appeared to be a mixture of disturbed soil and imported fill.

The stratigraphic profile of Unit 110 (Figure 13-10) indicated four distinct strata. Stratum I (0-40 cm) consisted of moderately compacted, dark grayish-brown silty sand with fine-grained texture (Munsell 10 YR 4/2). Stratum II (40-80 cm) consisted of moderately compacted, olive brown sand with mottled inclusions of Stratum I soils (Munsell 10 YR 4/3). Stratum III, which was found interspersed with Stratum II between 40 and 80 cm, consisted of heavily compacted, olive brown sandy clay (Munsell 10 YR 5/3). Stratum IV (80-150 cm) consisted of moderately compacted, pale yellow sand with medium grained texture. Unlike the other units excavated during this investigation, the heavily compacted clay layer was encountered only in patches between the 40 and 80 cm depth.

Unit 110 is composed of re-deposited fill; therefore, the vertical distribution (Table 13-9) of the cultural material is disturbed and highly suspect. Modern material was recovered down to 80 cm in depth, although the highest density of modern material was recovered between 0 and 10 cm below the surface and included modern roofing material, pellet gun pellets, safety pins, and plastic buttons.

**Table 13-9. Density of Cultural Material of Unit 110**

| *Unit* | *0-10cm* | *10-20cm* | *20-30cm* | *30-40cm* | *40-50cm* | *50-60cm* | *60-70cm* | *70-80cm* |
|---|---|---|---|---|---|---|---|---|
| **Excavated Volume ($m^3$)** | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| **Prehistoric Artifacts** | | | | | | | | |
| Flaked Stone Tools(ct/$m^3$) | 20 | - | 10 | 10 | - | - | 10 | - |
| Debitage(ct/$m^3$) | 110 | 50 | 250 | 350 | 120 | 170 | 70 | 30 |
| Groundstone(ct/$m^3$) | - | - | - | - | - | - | 10 | - |
| Tizon(ct/$m^3$) | - | - | - | - | - | - | - | - |
| FAR(g/$m^3$) | 845 | - | - | 2,078 | 5,531 | 2,644 | 10,655 | - |
| **Historic Material** | | | | | | | | |
| Glass(g/$m^3$) | 1,637 | 149 | 46 | 8 | - | 3 | - | - |
| Ceramics(g/$m^3$) | - | - | - | - | - | - | - | - |
| Metal(g/$m^3$) | 211 | 462 | 872 | 119 | 207 | 9 | - | 74 |
| Tile/Brick(g/$m^3$) | 528 | 6 | - | - | - | - | - | - |
| **Faunal Material** | | | | | | | | |
| Bone(g/$m^3$) | 18 | 22 | 174 | 162 | 213 | 152 | 94 | 69 |
| Shell(g/$m^3$) | 624 | 526 | 240 | 71 | 22 | 30 | 1 | 4 |
| **Modern Material** | | | | | | | | |
| Modern(g/$m^3$) | 1,980 | 224 | 18 | 32 | 13 | 16 | 3 | 1 |

*Note: Densities rounded to nearest whole number.*

### *Summary*

The excavations around the ranch house demonstrate that site integrity is relatively poor in Locus B. The units closest to the ranch house—Units 102, 103, and 110—contain the most severely disturbed cultural deposits. Two of the units contained metal pipes (Units 102 and 110), and all three units appeared to contain imported fill and/or re-deposited material. Modern material was recovered from all excavation units up to a depth of 80 cm (average maximum depth was 50 cm). In addition, prehistoric, historic, and modern material are thoroughly mixed together in most, if

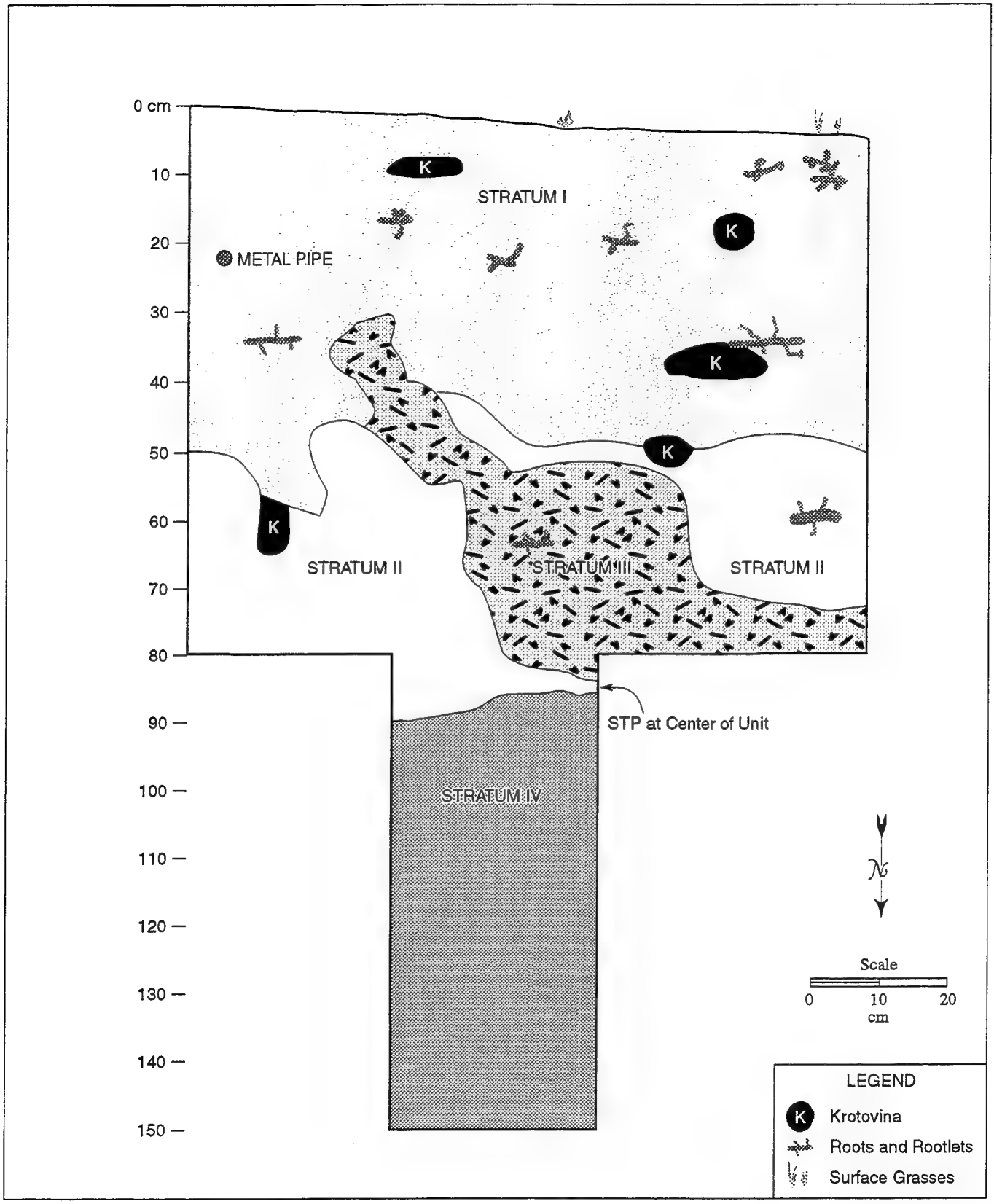



**Figure 13-10. South Wall Profile of Unit 110 Displaying Stratigraphic Layers**

not all, of the cultural deposits (Figure 13-11). The presence of modern debris throughout the soil deposits, extensive signs of bioturbation from all units, and the mixture of historic with prehistoric cultural material demonstrate that soil mixing has been somewhat severe. Soil mixing has been caused by rodent and tree root disturbance, historic and modern plowing, ranch house construction-related activities, and modern military and Boy Scout use.

## 13.3 SUMMARY OF CHRONOLOGY

### Radiocarbon Dates

Three samples of *Donax* shell were submitted to Beta Analytic, Inc. in Florida, for radiocarbon analysis. *Donax* shell was used for radiocarbon analysis because it was the dominant shell at this site and many others within the Las Flores Creek drainage (see Chapter 17). It is important to only date shell from a single species because different species metabolize carbon in slightly different ways and these differences could skew any radiocarbon dates based on mixed species.

The samples yielded conventional dates ranging from 870 ± 60 to 910 ± 60 years B.P. (Table 13-10). The samples were taken from Units 101, 104, and 105. All three dates were remarkably similar, with calibration dates ranging from A.D. 1485-1740, A.D. 1515-1835, and A.D. 1485-1835, respectively.

**Table 13-10. Radiocarbon Dates from Locus B of SDI-812/H**

| *Beta No.* | *Unit/Depth* | *Sample Type* [1,3] | *Conventional $^{14}C$ Age (B.P.)* [2] | *Calibrated 1 Sigma Range* | *Calibrated 2 Sigma Range* |
|---|---|---|---|---|---|
| 116985 | 101/20-30cm | *Donax* | 910 ± 60 | A.D. 1540-1685 | A.D. 1485-1740 |
| 116986 | 104/10-20cm | *Donax* | 870 ± 60 | A.D. 1620-1705 | A.D. 1515-1835 |
| 116987 | 105/30-40cm | *Donax* | 890 ± 70 | A.D. 1550-1700 | A.D. 1485-1835 |

*Notes:*
1. All shell samples consisted of multiple valves of *Donax gouldii*.
2. Conventional radiocarbon age based on an estimated figure of +410 years for $^{13}C/^{12}C$ correction; published local reservoir effect for southwest United States coast of -230 ± 25, rounded to the nearest 10 years (see Appendix H).
3. All samples dated by standard counting methods.

The calibrated dates of the Locus B samples range from the Late Prehistoric to the Historic time periods. In the northern part of San Diego County, the Late Prehistoric period is represented by the San Luis Rey complex (ca. A.D. 1400-1850), which is considered to represent the Shoshonean predecessors of the ethnohistoric Luiseño (see Chapter 2 for more information).

The radiocarbon samples from Locus B pre-date the 1867 construction of the Las Flores Adobe Ranch House and overlap with the San Luis Rey (Late Prehistoric/Ethnohistoric) and Mission periods. The Locus B radiocarbon dates also overlap with those derived from a buried component at Locus C (Unit 19) of SDI-812/H (see Table 5-2) which was clearly associated with a prehistoric Luiseño occupation. The buried component at Locus C was characterized by high densities of lithic artifacts, rabbit and other small game, marine shell, and Tizon Brownware (see Chapter 5 for more details). The buried component did not contain domesticated species, historic glass, metal, ceramics, or tile/brick, demonstrating that a clearly prehistoric occupation existed in the area around the same time that Locus B was occupied.

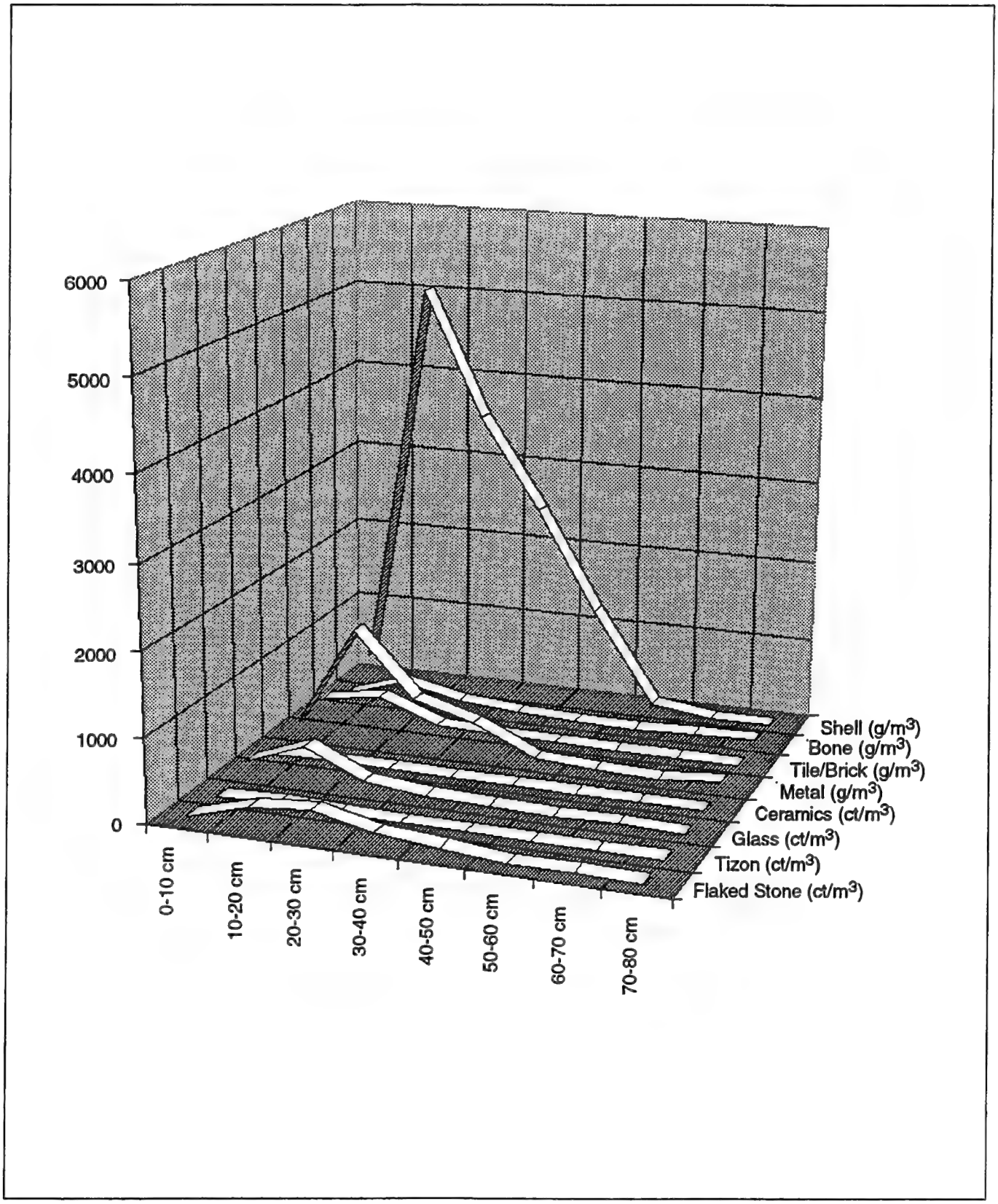



**Figure 13-11. Locus B Vertical Densities from SAIC's 1998 Excavations**

### Temporally Diagnostic Artifacts

It is impossible to differentiate a Late Prehistoric or Ethnohistoric occupation at Locus B through absolute dating techniques because radiocarbon dating is not precise enough to differentiate these deposits from later historic time periods. Relative dating techniques, including the identification of temporally diagnostic artifacts such as ceramics, metals, glass beads, projectile points, Euroamerican material, and domesticated animal remains, play an important role in deciphering the chronology of the site.

Flaked stone tools and Tizon Brownware were recovered from the site deposits and usually are considered to represent prehistoric Luiseño activities, although it is possible that the Luiseño were still making and using such items during historic times. Other temporally diagnostic artifacts from Locus B, such as domesticated cow, glass bottles and ceramic fragments from the late 1800s, and World War II bullet casings, represent activities from Historic and Modern times (see Chapters 6 and 8 for more details). Based on the temporally diagnostic artifacts recovered from Locus B, it is clear that Locus B contains a historic component associated with the agricultural and ranching days of the ranch house (post-1867) as well as modern debris from the Camp Pendleton Marines and Boy Scouts. In addition, radiocarbon analysis has clearly demonstrated the presence of a prehistoric deposit.

## 13.4 HUMAN REMAINS

A single human tooth was recovered from Unit 110 between 60 and 70 cm in depth. The tooth is probably deciduous and was probably lost naturally before death. The tooth comes from a disturbed area of the site that contains re-deposited soil. Although the tooth may have come from a Native American child, the tooth may have been lost by one of the hundreds of Boys Scouts who have camped in this area during the last 25 years.

# 14 FLAKED STONE ANALYSIS

## 14.1 INTRODUCTION

The flaked stone assemblage from Locus B of SDI-812/H was analyzed by Dr. Sean Hess. The purpose of this analysis was to assess the extent to which the flaked stone assemblage from the ranch house in Locus B of SDI-812/H can provide data relevant to important research issues in Las Flores Creek Drainage prehistory. The three research issues that will figure most prominently in this analysis are 1) the role of SDI-812/H in regional settlement systems, 2) the nature of the subsistence activities undertaken at the site, and 3) regional patterns of interaction. It will be shown that the flaked stone assemblage from around the ranch house does have the capacity to provide important information about these issues.

After a brief discussion of important research issues in Las Flores Creek Drainage prehistory that may be addressed with data from flaked stone artifacts, this analysis provides a description of how specific categories of data were collected. In the Results section, these data are analyzed and patterns in raw material selection, techniques of manufacture, and degree of refinement are discussed. The final section of this chapter summarizes the results of the analysis and brings this information to bear on important research issues.

## 14.2 FLAKED STONE RESEARCH ISSUES IN THE LAS FLORES CREEK DRAINAGE

Archaeologists working with shell midden sites along the Pacific Coast have generally focused the bulk of their analytical attention on vertebrate and invertebrate faunal remains. These remains provide direct information about prehistoric subsistence practices, and under a cultural ecological approach to anthropology, changes in subsistence are seen as driving most cultural changes. Nevertheless, flaked stone artifacts can provide important information about prehistoric lifeways, especially the techniques used to manufacture flaked stone tools and the factors that motivate decisions about which technique to choose, the role of sites in regional settlement patterns, and regional patterns of interaction through analysis of raw material distributions.

One of the most advanced attempts to link "lithics and livelihood" in the Las Flores Creek Drainage has been Eighmey's (1996) analysis of flaked stone artifacts from test excavations at Red Beach (SDI-811) and two other sites (SDI-4536 and SDI-10726) in Camp Pendleton. He argued that the uniformity through time in the flaked stone tools is probably a response to similarity in tool needs through time, as the groups occupying the project sites were always using marine/littoral resources. At the same time, Eighmey (1996:315) recognized that the similarity in assemblages

through time may also be a response to the fact that "there are only so many ways to reduce a coarse-grained beach cobble."

Analysis of materials unearthed during the data recovery excavations at the Red Beach Site (SAIC 1998) refined notions about flaked stone tool production goals. Building on Eighmey's earlier work on cobble core reduction techniques, Hess (1998) found evidence of both patterned (i.e., unidirectional core reduction) and unpatterned (i.e., bipolar or amorphous core reduction) reduction techniques in the Red Beach assemblage. After finding that relatively fine-grained and coarse-grained beach cobbles were treated in the same fashion, he concluded that the graininess of the worked cobbles was not driving decisions on how to use them, and that other considerations must have influenced decisions about how to produce flaked stone tools. Hess (1998) theorized that the lack of Piedra de Lumbre (PDL) chert in the Red Beach assemblage could be explained by the fact that this material is not well-suited to the production of large flake tools, while the locally available large beach cobbles are ideally suited for this task (see Eighmey [1996] for similar theories). In some cases, the occupants of the site appear to have required large, standardized flake tools, possibly for working hard materials like wood or bone. This need for large, standardized tools led them to use patterned reduction techniques. In other cases, the functional requirements were less stringent, allowing them to use unpatterned core reduction techniques.

Debates about the nature of flaked stone manufacturing techniques are only useful to anthropological archaeology if they contribute information about prehistoric lifeways. Eighmey (1996) looked beyond the issue of manufacturing techniques to the issue of flaked stone assemblage diversity and its relationship to duration of site occupation and the place of the sites within a broader settlement system. Noting the lack of substantial evidence of the manufacture of projectile points and bifaces, Eighmey (1996:316) proposed that the "manufacture of more elaborate toolkits was clearly taking place elsewhere in their seasonal rounds. In either case, their use was probably largely off-site given the small number of fragments of such tools." This means that we should not take the lithic assemblages from any single site in the Camp Pendleton Coastal Zone to be representative of the entire scope of lithic manufacture undertaken by the sites' occupants throughout the year. Furthermore, Eighmey (1996:316) argued that "the limited number of discarded tools and debitage types strongly suggest that these sites represent short-term occupations concentrated on the exploitation of coastal resources."

If flaked stone assemblages were the only lenses through which we could view prehistoric settlement and subsistence, this conclusion would probably be regarded with little controversy. The biggest problem comes when we compare the conclusions derived from the analysis of the flaked stone assemblages to the analysis of the vertebrate and invertebrate faunal remains. In their interpretation of the significance of the dense shell middens at SDI-4538, SDI-811, and SDI-10726, ASM Affiliates (1996:317) contradict Eighmey's (1996) assessment of the duration of occupation by concluding that many of the Las Flores Creek Drainage sites "were not simply short-term collection locations." While one may question the means by which ASM Affiliates (1996) interpreted *Donax* shell densities, the variety of both marine and terrestrial faunal remains found during later investigations also indicate that SDI-811 was used as a short-term residential base (SAIC 1998).

The large sample of flaked stone material recovered during the data recovery excavations, along with the use of a non-typological approach (*sensu* Ingbar et al. 1989) to debitage analysis, enabled Hess (1998) to take a fresh look at the issue of duration of occupation and site type at the Red Beach Site. Analysis of the debitage revealed no major differences in manufacturing techniques

used in different parts of the site, but comparisons of objective piece refinement did show that longer reduction sequences were represented in some portions of the site. The diversity and density of flaked stone tool assemblages in these same portions of the site also indicated that parts of the Red Beach Site were occupied for longer periods of time than other portions of the site.

The third research issue to emerge from earlier work in the Las Flores Creek Drainage is change through time in the use of PDL chert, a relatively high-quality lithic raw material that is available in bedrock outcrops about 7 km (north-northeast) from SDI-812/H (Pigniolo 1992). Significant variation in the percentage of PDL chert in debitage assemblages can be seen in Las Flores Creek Drainage sites, ranging from as low as 0.3 percent at the Red Beach Site to as high as about 50 percent in a buried component discovered in Unit 19, 19a, and 19b of Locus C, SDI-812/H. While some of the variation in the percentage of PDL chert in individual sites in this region might be due to differences in distance from the PDL source (cf. Renfrew's [1977] "Law of Monotonic Decrement"), the age of the component under consideration also appears to influence the frequency of PDL chert. With the exception of an Early Archaic component found in the lower portion of Unit 5 at SDI-10726, all of the early sites have less than 3 percent PDL chert. Late Prehistoric sites, on the other hand, generally have higher percentages of PDL chert, conforming to the temporal trends in the frequency of PDL chert noted by Pigniolo (1992). For example, just over six percent of the Late Prehistoric debitage assemblage from SDI-10726 was made of PDL chert, and SDI-10728 and SDI-4538 both contained debitage assemblages composed of just over twelve percent PDL chert (ASM Affiliates 1996, 1997).

Nevertheless, something other than site age and distance from source may also influence the frequency of PDL chert in the Las Flores Creek Drainage. Eighmey (1996) proposed that the lack of PDL chert at the Red Beach Site is due to the occupants' need for large flake tools that cannot be manufactured out of PDL chert. Furthermore, the occupants of the Red Beach Site may not have required the kinds of tools (i.e., projectile points and bifaces) that might best be made out of PDL chert.

The following analysis of flaked stone artifacts from the ranch house (SDI-812/H, Locus B) was designed to generate data applicable to the above three issues. As it will be shown in the Summary and Integration section, the flaked stone artifacts from the ranch house can help us understand these issues, especially when they are combined with data from other classes of material culture.

## 14.3 METHODS

### Definitions of Flaked Stone Artifact Classes

The project collection was divided for analysis into two main categories: worked flaked stone and debitage. *Debitage* is defined as "residual lithic material resulting from tool manufacture" (Crabtree 1982:32), and it includes both unmodified flakes ("any object showing a clear ventral flake surface, whether or not a striking platform is present" [Bamforth 1991:190]) and shatter. *Worked flaked stone* includes all objects from which flakes have been removed, regardless of whether or not that was done intentionally by the prehistoric knapper or unintentionally by post-depositional processes.

Determining whether the modifications seen in a particular worked lithic are intentional or unintentional is difficult using the macroscopic techniques available in this project, and it becomes

most crucial when one is trying to separate debitage from utilized flakes from flakes that were modified by post-depositional processes. In this study, any piece of debitage that showed some evidence of a modified edge, regardless of agency, was considered either a modified flake or a flake tool. *Utilized* or *Modified flakes* were separated from *flake tools* on the basis of the length of the flake scars that extend inward from the edge of the piece. Those pieces that have flake scars that extend less than 2 mm were considered modified flakes, while those that extend more than 2 mm were considered flake tools. While this cutoff point is arbitrary, it has the benefit of being an explicit standard, and it has been used in previous studies of flake tools (Barton 1988). Flake tool, as the category is used here, is synonymous with ASM's "unifacially retouched flake" category, while modified flake is synonymous with ASM's "utilized flake" (see ASM Affiliates 1996).

Three other categories of worked lithic were defined. Following the practice established in other analyses of lithics in the Camp Pendleton Coastal Zone, *bifacially retouched pieces* were any worked lithics that were bifacially worked over the majority of their surfaces. These were distinguished from *cores*, which were those items that did not appear to be used for any function other than acting as a source for flakes. The final category of worked lithic was *percussing tools*, which included hammerstones, choppers, and knapping stones.

**Raw Material Identification**

The material types present in the ranch house assemblage were identified on the basis of their macroscopically visible characteristics. Eight general categories were utilized. *Volcanics* included any relatively fine-grained extrusive igneous rocks, most of which tended toward black or grey in the ranch house assemblage. As used here, "volcanic" is generally synonymous with "basalt," but the geochemical tests required to separate basalt from andesite from dacite from rhyolite were not conducted. A few of the pieces of volcanic rock were porphyritic, but they were uncommon and easily distinguishable from the lighter colored granitic rocks. *Granitics* included any coarse-grained plutonic igneous rock made of macroscopically visible crystals of quartz, feldspar, and other minerals. This category included not only true granites, but also diorites and gabbros. *Quartz* includes any flaked stone artifact made of macrocrystalline quartz (i.e., any quartz with macroscopically visible crystal planes). Both clear quartz crystal and milky or vein quartz are present in the assemblage. *Quartzite*, on the other hand, is a metamorphic rock made of relatively small pieces of quartz that have been bonded together by heat and pressure. Pieces of quartzite were distinguished from quartz by their lack of large crystal faces and the appearance that they are made of welded grains of sugar.

Following Luedtke (1992:5), "*chert* is used as the general term for all sedimentary rocks composed primarily of microcrystalline quartz, including flint, chalcedony, agate, jasper, hornstone, novaculite, and several varieties of semiprecious gems" [italics as in the original]. These rocks were separated from the igneous rocks by virtue of their texture, luster, and other macroscopic characteristics. Some of the chert artifacts were assigned to the *undifferentiated chert* category because they did not match the characteristics of any one chert source. An important exception is chert from the *Piedra de Lumbre* chert source, which is located about 7 km north-northeast of SDI-812/H in the upper part of the Piedra de Lumbre drainage. Pigniolo's (1992:57-58) macroscopic description of PDL chert was used to identify PDL chert in the collection from SDI-812/H.

The only other rock type found in the flaked stone assemblage was *obsidian*. Obsidian is easily recognizable by its high luster, transparency, and excellent conchoidal fracture characteristics.

Any other rock that did not fit into one of these categories was assigned to the *undifferentiated rock* class.

**Procedures and Variables for Worked Flaked Stone**

*Cores*

The raw material type of the cores was recorded as described in the Raw Material Identification section (see above). They were then classified according to the number of striking platforms evident. Cores with a single striking platform from which all flakes were driven in the same direction were classified as *unidirectional*. Cores that had two striking platforms were labeled *bidirectional*, while those that took the form of large bifaces were categorized as *bifacial* cores (no bidirectional or bifacial cores were identified in this assemblage). Those cores that had multiple striking platforms were classified as *polymorphic* or *amorphous* cores. Cores that could not be placed into any of these categories were put into the *other* category. Categorization of the cores according to type allowed the comparison of manufacturing techniques between and within sites.

Other formal attributes that were recorded included *completeness* (complete or fragmentary), *cortex type* (water-worn, bedrock, none, or other), and the core's basic *dimensions* (length, width, thickness, and weight). Those cores that were used more extensively than others should be both smaller and more fragmentary. Therefore, these attributes helped us to understand extent of refinement.

*Bifacially Retouched Pieces (Bifaces)*

Four numerical attributes were recorded from each of the bifaces: length, width, thickness, and weight. All of the distances were measured to the nearest 0.1 mm with a digital caliper, while weight was measured on a digital scale to the nearest 0.1 gram. Three categorical attributes were also recorded: condition or fragment type, breakage type, and production stage.

Production stage is a subjective measurement employed by many researchers (see Callahan 1979; Shott 1996). This system ranks bifaces according to perceived stages of reduction, from thick items with only a few percussion scars removed from each side and little edge regularity (stage 1), to thinner percussion thinned pieces with planar symmetry and regular margin shapes (stage 3), to thin and complexly pressure flaked items with highly regular edges (stage 5).

*Flake Tools and Modified or Utilized Flakes*

Attributes recorded for the flake tools included completeness (complete vs. fragmentary), dorsal cortex coverage (as defined for the debitage), and basic dimensional data (length, width, thickness, and weight).

**Procedures and Variables for Debitage**

The debitage was analyzed to identify the types of manufacturing processes undertaken at the site and the degree to which objective pieces (i.e., cores or bifaces) were refined. This approach has sometimes been called the "non-typological approach" because it does not rely on the classification of debitage into a series of morphological or technological types (Ingbar et al. 1989). Instead, the focus is on measuring various attributes of individual pieces of debitage, and then statistically analyzing the data to determine how the assemblage was created.

All of the debitage was size sorted by screening through 1/4-inch mesh, separating out those debitage that were retained in the screen (i.e., the 1/4-inch and larger debitage) from the debitage that passed through the screen (i.e., smaller than the 1/4-inch mesh but larger than the 1/8-inch mesh used in the original screening). The debitage retained in the 1/4-inch mesh screen is called the 1/4-inch *fraction*, while the smaller debitage is called the *1/8-inch fraction*.

Seven different attributes were recorded from debitage in the 1/4-inch fraction: raw material type, completeness, platform type, dorsal cortex class, width, weight, and dorsal scar count.

**Completeness.** Each piece of debitage was coded as complete (C), proximal (P), distal (D), medial (M), split platform (S), and other (O), following the categories set out in Byrd et al. (1995). Completeness has sometimes been used to argue for particular stages of manufacture. For example, it is commonly thought that incomplete flakes (i.e., shatter) are most common in the early stages of reduction sequences (Sullivan and Rozen 1985), but this approach has been criticized (Amick and Mauldin 1989; Ensor and Roemer 1989). Nonetheless, it is an effective way of providing basic descriptive data about the characteristics of the flake and its degree of fragmentation. Split platforms are also indicative of bipolar reduction or wedging initiations (Cotterell and Kamminga 1987). The "Other" category is reserved for those pieces of debitage in which one cannot reliably tell if the piece is complete or not. This category also includes "shatter."

**Platform Type.** Platform type was the second debitage attribute covered in Brian F Mooney Associates (1995), and it is included here to provide for intersite comparisons. Each piece of debitage was coded as cortical (C), crushed (CR), single faceted (S), multifaceted (M), split (L), split and cortical (LC), thin (T), none (N), and other (O). This attribute can be used to inform us about both the techniques of manufacture used and degree of refinement. As reduction of an objective piece proceeds, debitage with cortical platforms should give way to debitage with single faceted platforms, and then multifaceted platforms. Split platforms are indicative of a particular manufacturing technique, bipolar reduction. Multifaceted platforms can occur as the result of almost any manufacturing technique, but they are particularly common in biface production. "Other" is reserved for those cases in which a platform may be present, but it cannot be easily identified.

**Dorsal Cortex Class.** Different but comparable means of recording the amount of dorsal cortex on debitage have been used in the report of sites in the San Onofre/San Mateo area (Brian F. Mooney Associates 1995), the testing report for SDI-10728 (ASM Affiliates 1997), investigations at SDI-811 (SAIC 1998), and the excavations at SDI-812/H (SAIC 1996b). Although the definitions used here exactly match only SAIC's 1998 report, they will allow for intersite comparison with all of the above sites. A piece of debitage was coded as a decortication flake (D) if 100 percent of its dorsal surface was covered with cortex, a primary flake (P) if 99-75 percent of its dorsal surface was cortex covered, secondary (S) if the dorsal surface was 74-1 percent cortex covered, and tertiary (T) if the flake did not have any dorsal cortex.

Dorsal cortex class is best used as an indicator of the stage of production. As objective pieces are progressively refined, they tend to produce debitage with less and less dorsal cortex, assuming that the objective pieces had cortex on them in the first place. In the study area, where many of the objective pieces appear to have been water-worn cobbles, this is probably a safe assumption. Chert objective pieces from bedrock outcrops (i.e., PDL chert) may not have had any cortex even in their earliest stages, so caution was used in the comparison of chert artifacts from different sites or analytical units.

**Maximum Width.** Width was measured to the nearest 0.1 mm as the greatest distance between lateral flake margins along an axis perpendicular to the axis of applied force. With the exception of debitage analysis from SDI-811 (SAIC 1998), the width of debitage has not been reported for other sites in the Las Flores Creek Drainage. Nevertheless, this attribute has been used in a number of other analyses (Bamforth 1991; SAIC 1998), allowing the data from SDI-812/H to be compared to sites in other areas that have a wider range of lithic raw materials available.

The width of debitage in an assemblage can inform us about techniques of manufacture. Using quantile plots of debitage width, one can determine the likely technique of manufacture by the slope of the plotted points. Debitage assemblages derived from the reduction of cores tends to produce quantile plots of debitage width with relatively flat slopes, while plots based on debitage assemblages produced from the manufacture of bifaces tends to produce more nearly vertical slopes.

**Weight.** Weight was measured to the nearest 0.1 g using an electronic scale. Mean weight of debitage was reported for two sites in Brian F. Mooney Associates (1995) and SDI-811 (SAIC 1998), but most of the other reports from the Las Flores Creek Drainage have not reported on this attribute. Weight is a good measure of the stage of production. As the size of objective pieces decreases with progressive reduction, the weight of the resultant debitage also declines. Assemblages that have small average weights should be seen as being later in stage than assemblages with high average weights, assuming that one has controlled for differences in raw material type (Odell 1989).

**Dorsal Scar Count.** The number of flake scars greater than 2 mm in length on the dorsal surface of pieces of debitage was recorded. Flakes classified as decortication flakes received a dorsal scar count value of zero, and flakes that had no arrises on the dorsal surface were given a dorsal scar count value of one. The minimum length of 2 mm was established to help separate incidental flake removals from larger, more important, flake removals.

Dorsal scar count, in and of itself, has a checkered history in reconstructing degree of refinement or stages of production. While some early experimenters found a good relationship between stage and the number of dorsal flake scars (Magne and Pokotylo 1981), later studies have not born this out (Connolly and Musil 1994; Ingbar et al. 1989). Nevertheless, Ingbar et al. (1989) found that dorsal scar count, when combined with other measures of debitage size to form dorsal scar density (i.e., dorsal scar count/flake length x width), was effective in characterizing the stage of debitage assemblages. That is, as the objective piece became more refined or more time was invested in shaping it, the debitage resulting from it tended to have a higher dorsal scar density. Tomka (1989) has also used dorsal scar count in combination with debitage size to distinguish amorphous core reduction from biface production.

Flakes smaller than 1/4-inch were examined less intensively than the larger flakes because they are likely to carry less technological information and are more difficult to measure accurately (cf. Bamforth 1984, 1991). Therefore, data collected from 1/8-inch fraction debitage was limited to raw material type and aggregate weight/count by unit and level. The quartz debitage were excluded from detailed analysis regardless of size because their nonconchoidal fracture characteristics make it difficult to identify pertinent flake characteristics. Quartzite, granitic, and obsidian flakes were not common enough in the recovered assemblage for reliable statistical analysis, so analysis of these pieces was also limited to identification of material type and aggregate weight. All of the PDL chert from the ranch house assemblage was analyzed (n=105). For the purposes of intra-site

comparisons, a sample of the PDL chert from the earlier excavations in Locus C, Units 19, 19a, and 19b, levels 130-140 cm and 140-150 cm (n=127) was also selected (see Chapter 5 for more details). Analysis of the volcanic debitage focused on a sample of 111 pieces of debitage selected from Units 104 and 101. The debitage from these units were selected because they came from the most intact and dense portion of the prehistoric deposit at the ranch house (see the Site Structure section in Chapter 13). In total, 343 pieces of debitage from the 1/4-inch fraction were analyzed as a part of this study.

## 14.4 RESULTS

### Assemblage Content

The excavations at the ranch house resulted in the recovery of over 1,200 flaked stone artifacts from both the auger holes and the excavation units (Table 14-1). Because of the limited quantity of items recovered from the auger holes, all of the following analysis will focus on the materials from the excavation units. As seen below, the overwhelming majority of the flaked stone artifacts recovered from the test excavation units (98.7 percent) were pieces of debitage, so much of the analysis will focus on that class of artifacts. An example of one of the cores and the two flake tools are illustrated in Figure 14-1. For more detailed data about individual artifacts, please consult the lithic data tables in Appendix G.

**Table 14-1. Flaked Stone Artifacts from the Ranch House by Unit Type**

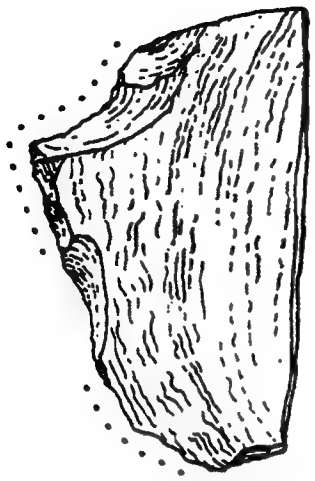
| *Artifact Class* | *Auger Holes* | *Units* | *Total* |
|---|---|---|---|
| Debitage | 66 | 1,185 | 1,251 |
| Cores | - | 12 | 12 |
| Flake Tools | - | 2 | 2 |
| Modified/Utilized Flakes | - | - | - |
| Bifaces | - | 2 | 2 |
| Total | 66 | 1,201 | 1,267 |

As noted in the Methods section above, all of the debitage was sorted by material type into 1/8-inch and 1/4-inch fractions. Volcanic and chert debitage were the most common raw material types, followed closely by quartz (Table 14-2).

### Technological Analysis

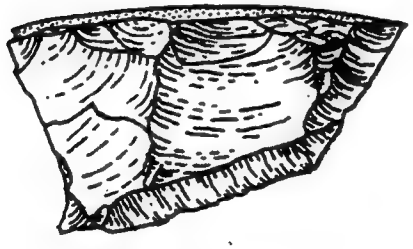
#### *Raw Material Selection*

Looking at the entire flaked stone assemblage, volcanic rock is the most common raw material, followed by chert and quartz (Table 14-3). All other material types account for less than five percent. The volcanic rock, quartz, and quartzite used to manufacture flaked stone tools were procured from stream or beach gravel, as indicated by the water-worn cortex visible on many of the pieces of debitage and some of the cores. Water-worn cortex was not found on PDL chert, indicating that the majority of it came from a bedrock outcrop. Due to the fact that PDL chert was not separated from non-PDL chert during the rough-sorting of the 1/8-inch fraction, no exact count of the PDL chert debitage in the collection is available. Of the 129 chert flakes in the 1/4-inch fraction, 105 (81.4 percent) were made of PDL chert. Extending this percentage to the entire chert debitage assemblage, it is likely that there were at least 267 pieces of PDL chert debitage, including



Catalog No. 1168
Flake Tool
Unit 104, 20 – 30 cm

Catalog No. 1174
Flake Tool
Unit 110, 0 – 10 cm



Catalog No. 717
Unidirectional Core
Unit 110, 20 – 30 cm

LEGEND

• • • • • Worked Edge

Scale

0 5

cm

**Figure 14-1. Flake Stone Artifacts from Locus B**

**Table 14-2. Frequency of Debitage in the 1/4-inch and 1/8-inch Fractions by Material Type, SDI-812/H**

| | 1/4" FRACTION | | 1/8" FRACTION | | TOTAL | |
|---|---|---|---|---|---|---|
| *Material* | *ct.* | *row %* | *ct.* | *row %* | *ct.* | *column %* |
| Volcanic | 419 | 73.8% | 149 | 26.2% | 568 | 47.9% |
| Chert * | 129 | 39.3% | 199 | 60.7% | 328 | 27.7% |
| Quartz | 135 | 56.7% | 103 | 43.3% | 238 | 20.1% |
| Quartzite | 30 | 73.2% | 11 | 26.8% | 41 | 3.5% |
| Undiff. | 1 | 14.3% | 6 | 85.7% | 7 | 0.6% |
| Obsidian | 2 | 66.7% | 1 | 33.3% | 3 | 0.3% |
| Total | 716 | 60.4% | 469 | 39.6% | 1185 | 100.0% |

* This includes both PDL chert and undifferentiated chert.

both the 1/4-inch and 1/8-inch fractions. This would constitute about 22.5 percent of all of the recovered debitage. Undifferentiated non-PDL chert probably makes up about 5.1 percent of the total debitage assemblage.

Table 14-3 also shows that all the bifaces were made out of chert, while the cores and the expedient flake tools were made out of locally available, coarse-grained materials. This pattern, in which relatively formal tools are made out of fine-grained materials and less formal tools are made out of coarse-grained materials, has been observed in other hunter-gatherer flaked stone assemblages (Andrefsky 1995; Bamforth 1984, 1991). This phenomenon is usually interpreted as being the result of greater ease of access to coarse-grained materials in most sites, while fine-grained materials are much less widespread and are usually reserved for those classes of artifacts that demand a high degree of flake control to manufacture successfully (Andrefsky 1995). The pattern of raw material availability at SDI-812/H fits this pattern easily.

**Table 14-3. Flaked Stone Artifacts by Material Type, SDI-812/H**

| | DEBITAGE | | CORES | | FLAKE TOOLS | | BIFACES | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Material* | *ct.* | *%* | *ct.* | *%* | *ct.* | *%* | *ct.* | *%* | *ct.* | *%* |
| Volcanic | 568 | 47.9% | 6 | 50.0% | 2 | 100.0% | - | - | 576 | 48.0% |
| Chert | 328 | 27.7% | - | - | - | - | 2 | 100.0% | 330 | 27.5% |
| Quartz | 238 | 20.1% | 5 | 41.7% | - | - | - | - | 243 | 20.2% |
| Quartzite | 41 | 3.5% | 1 | 8.3% | - | - | - | - | 42 | 3.5% |
| Undiff. | 7 | 0.6% | - | - | - | - | - | - | 7 | 0.6% |
| Obsidian | 3 | 0.3% | - | - | - | - | - | - | 3 | 0.2% |
| Total | 1185 | 100.0% | 12 | 100.0% | 2 | 100.0% | 2 | 100.0% | 1201 | 100.0% |
| % of Whole | | 98.7% | | 1.0% | | 0.2% | | 0.2% | | 100.0% |

Comparisons to other sites in the region show that the ranch house assemblage has an unusually high percentage of PDL chert, although the percentage is probably somewhat less than that seen in Unit 19 of Locus C. For example, only 6.4 percent of the debitage from the Late Prehistoric/Protohistoric component in Unit 5 at SDI-10726 was made of PDL chert (Table 14-4). SDI-10726 is about a kilometer south of the ranch house, so it is difficult to explain this dramatic difference in the percentage of PDL chert as a function of distance alone. Furthermore, the ranch house and the Late Prehistoric/Protohistoric component of SDI-10726 are roughly contemporaneous, so it is difficult to explain this difference as a function of age. Some possible

explanations for this significant variation over a small space will be explored in the *Summary and Integration* section at the end of this chapter.

**Table 14-4. Debitage Raw Material Percentages from Selected Sites in the Camp Pendleton Coastal Zone**

| *Site & Analytical Unit* | *Volcanic (%)* | *Quartz (%)* | *Quartzite (%)* | *Chert (%)* | *PDL (%)* | *Other (%)* | *Count (ct)* | *Age Range (calibrated)* |
|---|---|---|---|---|---|---|---|---|
| SDI-811 (All Debitage) | 68.5 | 26.0 | 3.3 | 0.3 | 0.3 | 1.5 | 3,247 | 1395 B.C.-A.D. 1000 |
| SDI-13325 | 82.4 | 11.0 | 1.4 | 1.5 | 2.5 | 1.4 | 1,177 | 2310-1910 B.C. to A.D. 440-700 |
| SDI-10728, Locus A | 81.5 | 15.3 | 0.1 | 0.4 | 2.6 | 0.1 | 916 | 6415-6000 B.C. to A.D. 1265-1455 |
| SDI-10726 (Unit 5, Lower) | 79.5 | 12.5 | - | 1.3 | 5.8 | 0.9 | 224 | 5520-5100 B.C. |
| SDI-1074 | 71.4 | 20.4 | 1.0 | 3.1 | 3.1 | 1.0 | 98 | A.D. 1280-1430 |
| SDI-4411 | 70.1 | 19.5 | 1.3 | 3.9 | 5.2 | - | 77 | A.D. 1400-1510 |
| SDI-10726 (Unit 5, Upper) | 83.0 | 9.4 | 0.2 | 0.5 | 6.4 | 0.5 | 607 | A.D. 1420-1660 |
| SDI-10728, Locus B | 73.0 | 14.6 | - | - | 12.4 | - | 65 | A.D. 1375-1675 |
| SDI-4538 | 51.6 | 34.9 | - | 0.5 | 12.6 | 0.5 | 215 | A.D. 985-1515 |
| SDI-812/H Ranch House | 47.9 | 20.1 | 3.5 | 5.1 | 22.5 | 0.9 | 1,185 | A.D. 1645-1670 |

*Techniques of Manufacture*

**Discarded Tools.** One of the most important sources of information about what kinds of manufacturing activities were undertaken at the ranch house are discarded tools that were broken during manufacture or tools that were completely used up. Three different classes of worked flaked stone were discarded at the ranch house: cores, flake tools, and bifaces. A total of twelve cores were recovered from the excavation units: six volcanic, five quartz, and one quartzite (Table 14-5). The cores were spread throughout the site with a single concentration of four cores present in Unit 110.

**Table 14-5. Characteristics of Cores Recovered from the Ranch House, SDI-812/H**

| *Unit* | *Level* | *Material* | *Core type* |
|---|---|---|---|
| 101 | 30-40 cm | Volcanic | Unidirectional |
| 101 | 30-40 cm | Quartz | Amorphous |
| 102 | 40-50 cm | Volcanic | Amorphous |
| 103 | 30-40 cm | Volcanic | Unidirectional |
| 104 | 20-30 cm | Volcanic | Amorphous |
| 105 | 40-50 cm | Quartz | Amorphous |
| 106 | 10-20 cm | Quartz | Amorphous |
| 109 | 30-40 cm | Quartz | Amorphous |
| 110 | 0-10 cm | Volcanic | Unidirectional |
| 110 | 20-30 cm | Volcanic | Unidirectional |
| 110 | 30-40 cm | Quartz | Amorphous |
| 110 | 60-70 cm | Quartzite | Amorphous |

Unidirectional cores were only made from volcanic rock, while all of the quartz cores were more amorphous in form. Unidirectional cores have been found in other sites in the Las Flores Creek Drainage (Hess 1998), so their presence in the ranch house deposit is not surprising. They indicate that a patterned core reduction technique was used to produce at least some of the volcanic debitage. Many of the quartz cores, on the other hand, are cubic or wedge-shaped, suggesting that bipolar reduction may have been used to shape the quartz cobbles, perhaps because of the intractability of this material. The two expedient flake tools recovered (Table 14-6) suggest that the flakes derived from the cores were used with little subsequent modification.

**Table 14-6. Characteristics of Flake Tools Recovered from the Ranch House, SDI-812/H**

| *Unit* | *Level* | *Material* | *Wt.* | *Comment* |
|---|---|---|---|---|
| 104 | 20-30 cm | Volcanic | 31.6 g | Minor retouch or use wear along distal margin of flake fragment |
| 110 | 0-10 cm | Volcanic | 20.8 g | Minor bifacial retouch or use-wear on lateral margin |

Unlike the assemblage recovered from the Red Beach Site, the ranch house assemblage produced evidence of early stage biface production. Both of the recovered bifaces are made of PDL chert, and both are fragmentary (Table 14-7). Nonetheless, they indicate that biface manufacture was one of the production goals of the site's occupants since both end-snaps and perverse fractures are typical of breakage during manufacture (Crabtree 1982; Callahan 1979).

**Table 14-7. Characteristics of Bifaces Recovered from the Ranch House, SDI-812/H**

| *Unit* | *Level* | *Material* | *Completeness* | *Breakage Type* | *Wt.* | *Stage* |
|---|---|---|---|---|---|---|
| 104 | 10-20 cm | PDL chert | Lateral frag. | End-snap | 1.4 g | 2 |
| 104 | 20-30 cm | PDL chert | Medial frag. | Perverse | 12.2 g | 2 |

**Debitage.** Analysis of the debitage recovered from the ranch house reveals the same basic patterns seen in the analysis of the discarded tools. Analyzing debitage platform types is one way to investigate manufacturing techniques used at the site. Debitage derived from the flaking of cores, particularly those made on water worn cobbles, often have platforms covered with cortex, split platforms, or single-faceted platforms. Production of bifaces and reduction of well-worked cores tends to produce debitage assemblages with a relatively high percentage of multi-faceted platforms (Shott 1994).

Comparison of the volcanic and PDL chert debitage from the ranch house, the PDL chert from the buried component in SDI-812/H, Locus C (Unit 19), and the volcanic debitage from two of the analytical units at the Red Beach Site show that the volcanic assemblages have more debitage with cortical, split, or split and cortical platforms than the PDL assemblages (Table 14-8). The PDL chert assemblages from both the ranch house and Unit 19 have significantly higher percentages of debitage with multifaceted platforms. This pattern is consistent with the conclusion that volcanic materials were used almost exclusively for the production of flakes from cores, while the PDL chert was used in the production of bifaces.

This dataset also facilitates intersite and intrasite comparisons. Comparison of the volcanic debitage from the ranch house to the volcanic debitage from the Red Beach Site shows no

significant differences. The somewhat higher percentage of split as well as split and cortical platforms from the ranch house assemblage relative to Analytical Units (AU) 1 and 2 from the Red Beach Site indicates greater reliance on bipolar reduction at the ranch house. The near absence of PDL chert at the Red Beach Site prevents any intersite comparisons using this material, but comparison of the ranch house and Unit 19 PDL chert assemblages shows that they are very similar. A $X^2$ test shows that the ranch house and Unit 19 assemblages are not significantly different with regard to the frequency of platform types at the 95 percent confidence level ($X^2$=3.20; df=5; p=0.669). Nevertheless, the results of the $X^2$ test are somewhat suspect because of the low number of cases in some of the classes.

**Table 14-8. Frequency of Platform Types by Raw Material Type and Locus, SDI-812/H**

| | SDI-811 AU 1 Volcanic | | SDI-811 AU 2 Volcanic | | SDI-812/H Ranch House Volcanic | | SDI-812/H Ranch House PDL chert | | SDI-812/H Unit 19 PDL chert | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Platform Type* | *ct* | *%* | *ct* | *%* | *ct* | *%* | *ct* | *%* | *Ct* | *%* |
| Cortical | 14 | 15.4 | 24 | 27.0 | 14 | 12.6 | 2 | 1.9 | 4 | 3.2 |
| Split & Cortical | 20 | 22.0 | 25 | 28.1 | 28 | 25.2 | - | - | - | - |
| Single Faceted | 6 | 6.6 | 4 | 4.5 | 13 | 11.7 | 18 | 17.1 | 30 | 23.6 |
| Crushed | 1 | 1.1 | 4 | 4.5 | 4 | 3.6 | 3 | 2.9 | 6 | 4.7 |
| Split | 2 | 2.2 | 5 | 5.6 | 12 | 10.8 | 2 | 1.9 | 3 | 2.4 |
| Multifaceted | 1 | 1.1 | - | - | 2 | 1.8 | 21 | 20.0 | 19 | 15.0 |
| No Platform | 47 | 51.6 | 27 | 30.3 | 38 | 34.2 | 59 | 56.2 | 65 | 51.2 |
| Total | 91 | 100.0 | 89 | 100.0 | 111 | 100.0 | 105 | 100.0 | 127 | 100.0 |

Width is another debitage attribute that can be employed to investigate techniques of manufacture. Lithic analysts have often used distributional curves showing the frequency of flakes of different sizes to help them understand the types of manufacturing processes used. Bamforth (1991), for example, used cumulative frequency plots based on debitage width to argue that biface manufacture was the most common manufacturing technique undertaken in sites impacted by the Union Oil Pipeline. A variation of that technique is used in this analysis, but instead of plotting cumulative frequency, quantile plots of debitage width are used to show the frequency of different flake widths. Using quantile plots of debitage width, one can determine the likely technique of manufacture by the slope of the plotted points. According to SPSS (1996:128),

"Quantile" is an alternative name for percentile when fractions, rather than percentages, are used. For example, the 0.5 quantile is the 50th percentile, the median, or the second quartile. Thus, quantile plots are useful for describing the distribution of a variable.

A quantile plot shows how many data points are below a particular value, and how many are above, and the points are ranked according to a particular attribute. In this case, the attribute is width. If all of the flakes in a group had the exact same width, they would form a vertical line of points. On the other hand, if none of the flakes had the same width, and the differences from one flake to the next was always the same, they would result in a quantile plot with a slanted line. Most datasets are a combination of these two possibilities (i.e., some flakes in an assemblage will have the same width, while others will be smaller or larger), creating curvilinear arrangements of points. Debitage assemblages derived from the reduction of cores tends to produce quantile plots of debitage width with relatively flat slopes, while plots based on debitage assemblages produced from the manufacture of bifaces tends to produce more nearly vertical slopes.

Figure 14-2 compares the quantile plots of PDL chert debitage from the ranch house and Unit 19, as well as volcanic debitage from the ranch house and AU1 and AU2 from the Red Beach Site. As one might expect, the curves formed by the PDL chert assemblages are much more nearly vertical than the volcanic assemblages, indicating that biface production was the main technique used to shape the PDL chert, while core reduction dominated the shaping of the volcanic objective pieces. Intrasite comparisons of PDL chert within SDI-812/H show no significant differences between the ranch house and Unit 19 PDL chert assemblages -- biface production was undertaken in both. Intersite comparisons between the Red Beach Site and the ranch house also show no important differences.

**Interpretations**. Both the discarded objective pieces and the debitage from the ranch house show that the nature of the raw material being worked strongly influenced decisions about what techniques of manufacture should be used. Patterned or bipolar core reduction appears to have been the favored technique for working water-worn cobbles made of volcanic rock, while PDL chert appears to have been used almost exclusively for biface production. Based on data from cores, quartz cobbles appear to have been shaped primarily by unpatterned or bipolar core reduction techniques.

This study has found little evidence suggesting that different manufacturing techniques were used in shaping volcanic rocks at the ranch house and the Red Beach Site. Both sites contained evidence of a mix of patterned and unpatterned volcanic core reduction techniques. Although the occupations at the Red Beach Site and the ranch house are from different time periods, there does not seem to be any evidence for changes in how volcanic cobbles were worked.

In contrast, change through time does appear in the use of PDL chert. The greater amount of PDL chert in Late Prehistoric assemblages in the Las Flores Creek Drainage suggests a greater emphasis on local biface production in comparison to earlier periods. Given that PDL chert is available in relatively small pieces, this increase may be tied to increases in the production of small bifaces like Late Prehistoric arrowheads (Pigniolo 1992).

The available data also allows the investigation of spatial trends. Analysis of some PDL chert from the earlier excavations in Unit 19 allowed intrasite comparisons at SDI-812/H. Similar biface production techniques appear to have been used to shape PDL chert in both portions of the site. Even though the dense deposit of PDL chert debitage in Unit 19 is from a different part of SDI-812/H than the ranch house, the radiocarbon dates, which have 2-sigma calibrated ranges of approximately A.D. 1485-1835, suggest that both parts of the site could have been occupied at the same time (see Tables 5-2 and 13-10).

*Degree of Refinement*

A third aspect of the lithic technology is the degree to which objective pieces made of different materials were refined by the occupants of the ranch house. In most studies, the stages of biface production made from different materials are compared, and this approach is appropriate to the analysis of the PDL chert debitage because there is strong evidence that PDL chert was used for the manufacture of bifaces. However, analysis of the volcanic debitage indicates that core reduction or expedient flake tool production was the primary goal, so comparison of "biface stages" would not be appropriate for this material type. Nevertheless, quantifying the extent to which volcanic objective pieces were refined will allow comparisons to SDI-811.

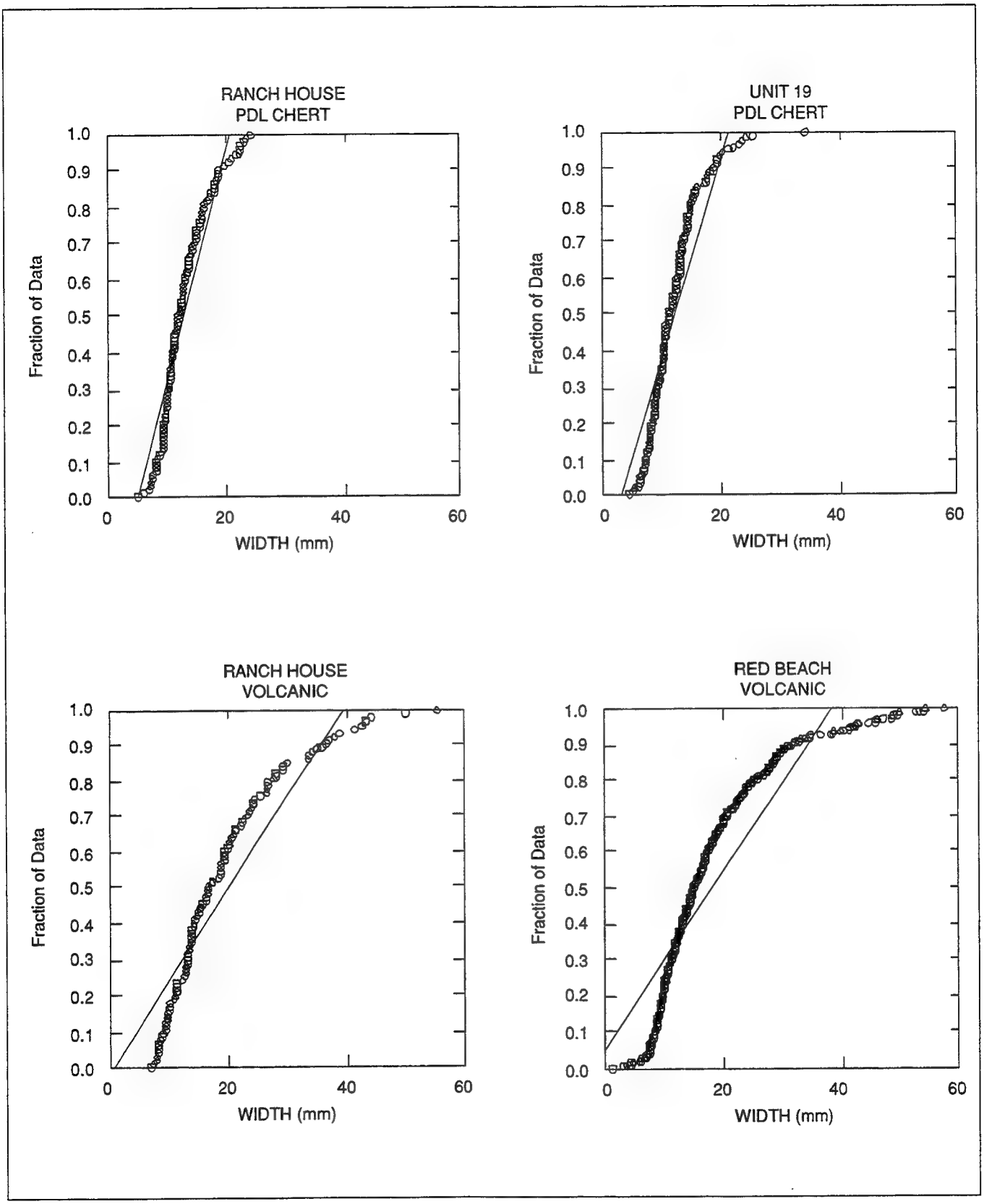



**Figure 14-2. Quantile Plots of Debitage Width By Material Type and Locus**

**Discarded Tools.** Only three classes of discarded tools (cores, flake tools, bifaces) were found in the ranch house excavations, but the low number of recovered tools makes it difficult to reach any conclusions about systematic differences in the degree of refinement. None of the cores could be said to be any more refined than any of the other cores. They all appear to have been discarded after they became too small to produce desirable flakes. Both of the discarded PDL chert bifaces reached Callahan's (1979) Stage 2 before breaking during manufacture. The recovery of numerous completed projectile points from Unit 19, 19a, and 19b (see Chapter 5) suggests that a later stage of biface reduction was occurring in Locus C than in the area around the ranch house.

**Debitage.** Experiments have shown that as an objective piece with cortex is progressively reduced or refined, the resulting debitage will tend to have less and less dorsal cortex as reduction proceeds (Shott 1994). By classifying the flakes into different dorsal cortex classes (i.e., decortication, primary, secondary, and tertiary), the extent to which objective pieces made of different materials or in different sites were refined can be compared. One important assumption is that all of the objective pieces originally had some type of cortex on them when they were procured from their source areas. For the volcanic materials, this is a reasonable assumption given that most of them were derived from water-worn cobbles. The cherts, on the other hand, appear to have come from bedrock quarries, and pieces with primary geologic cortex may not be as common. In other words, PDL chert debitage may have less dorsal cortex than the volcanic debitage because less cortex is present on the pieces removed from the source area. The data from SDI-812/H seems to corroborate this suspected pattern. As Table 14-9 shows, the PDL chert assemblages from the ranch house and Units 19, 19a, and 19b in Locus C have substantially lower percentages of dorsal cortex coverage than the volcanic debitage from the ranch house or the Red Beach site.

Intrasite comparison of the PDL chert debitage from the ranch house and Locus C (i.e., Unit 19) show that the flakes from Locus C have more dorsal cortex than the flakes from the ranch house. This suggests that the objective pieces worked at the ranch house were more refined than those worked in Locus C, but only slightly so. Intersite comparison of the volcanic debitage from the ranch house and the Red Beach site shows that the ranch house assemblage has slightly more pieces with dorsal cortex, but the difference is not dramatic.

**Table 14-9. Debitage by Dorsal Cortex Class, Raw Material, and Locus, SDI-812/H**

| | Unit 19 PDL Chert | | Ranch House PDL Chert | | Ranch House Volcanic | | Red Beach Volcanic | |
|---|---|---|---|---|---|---|---|---|
| *Cortex Class* | *ct* | *%* | *ct* | *%* | *ct* | *%* | *ct* | *%* |
| Decortication (100%) | 4 | 3.2 | 1 | 1.0 | 8 | 7.2 | 18 | 4.6 |
| Primary (75-99%) | 2 | 1.6 | 0 | 0.0 | 5 | 4.5 | 11 | 2.8 |
| Secondary (1-74%) | 6 | 4.7 | 2 | 1.9 | 10 | 9.0 | 23 | 5.9 |
| Tertiary (0%) | 115 | 90.6 | 102 | 97.1 | 88 | 79.3 | 336 | 86.6 |
| Total | 127 | 100.0 | 105 | 100.0 | 111 | 100.0 | 388 | 100.0 |

The comparison of dorsal cortex frequency suggests small scale differences in the degree of refinement, and dorsal scar density can be used to confirm these findings. Experimental production of flaked stone tools has shown that the density of dorsal flake scars on pieces of debitage tends to increase as manufacture progresses from one flake removal to the next (Ingbar et al. 1989). Dorsal scar density has several advantages over dorsal cortex frequencies, one of which is that it is not influenced by the amount of cortex present on pieces at the source area. That is, it allows comparisons between materials derived from secondary gravel deposits and primary geological deposits. While Ingbar et al. (1989) computed dorsal scar density based on the number of scars per unit of flake, they found that one could better anticipate the place of a flake in a sequence of flake removals (i.e., its "predicted removal number") if one also included the flake's thickness. Hess (1997) has modified this method by dividing the number of dorsal flake scars by the weight of the flake, reasoning that the flake weight will be directly proportional to flake volume. This is essentially what Ingbar et al. (1989) measured when they combined length, width, and thickness. Therefore, as objective pieces become more and more refined, the number of dorsal flake scars per gram (DSC/g) on debitage derived from those pieces should increase. Dorsal scar density is usually rightward skewed in the distribution of its values (i.e., there are many more small values than large ones), making it necessary to log-transform the data using the natural logarithm (log base *e*) to give it a more normal distribution before making any statistical comparisons (Shennan 1990). To avoid the problem of computing the log of 0 flake scars/gram, which is impossible, the minimum non-zero dorsal scar count per gram value from the earlier Red Beach analysis (0.017 scars/gram) was added to all of the cases prior to log-transformation.

Comparison of the mean log-transformed dorsal scar densities of the PDL chert from the ranch house and Unit 19 and the volcanic debitage from the ranch house and the Red Beach Site reveal significant differences between material types, but few differences between different sites or components (Figure 14-3). The PDL chert debitage from Unit 19 has a slightly higher mean dorsal scar density than the PDL chert from the ranch house (Table 14-10), but a Student's t-test shows that this difference is not significant at the 95 percent confidence level (t=-1.489; df=183.3; p=0.138). Likewise, the volcanic debitage from the ranch house does not appear to be significantly less refined than the debitage from the Red Beach Site.

**Table 14-10. Summary Statistics for Log-Transformed Dorsal Scar Density Data by Material Type and Locus, SDI-812/H**

| *Statistic* | *Unit 19 PDL cht.* | *Ranch PDL cht.* | *Ranch Volcanic* | *Red Beach Volcanic* |
|---|---|---|---|---|
| Number of Cases | 102 | 88 | 103 | 346 |
| Mean | 2.042 | 1.765 | 0.001 | 0.181 |
| Standard Deviation | 1.475 | 1.079 | 1.739 | 1.663 |

**Interpretations.** This comparison of dorsal scar density values and dorsal cortex coverage shows large-scale differences in the degree to which volcanic and PDL chert objective pieces were refined. Considering that there is more effort invested in the shaping of a chert biface than a bipolar or amorphous core made of volcanic rock, the observed difference between the material types should be expected.

At the same time, intrasite comparisons of PDL chert at SDI-812/H suggest that there may have been some small-scale differences in the extent to which bifaces and projectile points were refined. This can been seen in the presence of projectile points in the Locus C assemblage, which are absent

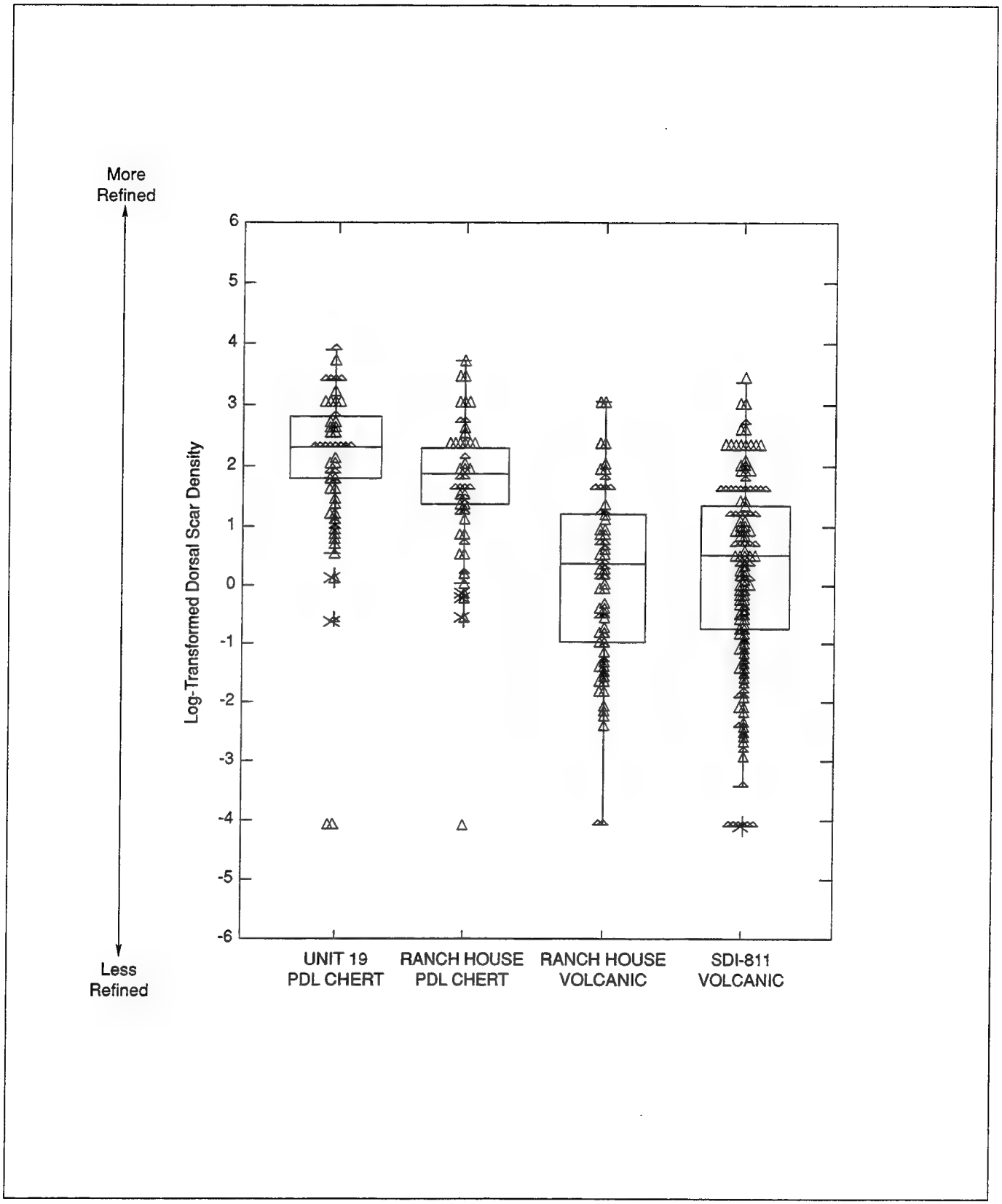



**Figure 14-3. Comparison of Debitage Dorsal Scar Densities**

in the ranch house assemblage, and the slightly higher dorsal scar density average for the Locus C debitage. However, the statistical analysis suggests that these differences probably are not significant. Intersite comparisons of volcanic debitage from the ranch house to the Red Beach site also show no large-scale differences in the degree of refinement.

## 14.5 SUMMARY AND INTEGRATION

Analysis of the flaked stone assemblage from the ranch house and the comparison to previously excavated materials from Locus C and the Red Beach Site has demonstrated three major points regarding raw material use. First, PDL chert is much more common in SDI-812/H than any other site in the Las Flores Creek Drainage. While the percentage of PDL chert in the ranch house debitage assemblage (22.5 percent) is lower than that found in the Locus C assemblage (c. 50 percent in Unit 19), PDL chert is still more common in the ranch house vicinity than any of the other contemporary sites in the area. This holds true even if we compare the ranch house assemblage to sites in the San Mateo area further up the coast.

Second, objective pieces made of PDL chert and volcanic rock were used in dramatically different ways. The PDL chert was shaped primarily into bifaces, while the volcanic rock was used in the manufacture of expedient flake tools using both patterned and unpatterned core reduction techniques. Based on core morphology, it appears that quartz and quartzite cobbles were reduced in roughly the same ways as volcanic rock. The one possible exception is the use of quartz crystal for the manufacture of small projectile points, a few of which were recovered from Locus C of SDI-812/H (see Chapter 5). However, no such evidence was recovered from the ranch house vicinity. Most of the quartz from the ranch house area was milky or vein quartz, which does not appear to have been used in the manufacture of projectile points.

Finally, comparison of the volcanic objective pieces and debitage from the Red Beach Site and the ranch house show that the same reduction techniques were used in both of these sites, despite the differences in the age of the two occupations. In short, there is no evidence for change through time in the use of water-worn volcanic cobbles. This supports the findings from earlier analyses comparing different analytical units at the Red Beach Site (Hess 1998), as well as other sites in the lower Las Flores Creek Drainage (Eighmey 1996).

Having made these conclusions about the patterns of raw material selection and flaked stone manufacture at SDI-812/H, questions remain about why these patterns are present. Perhaps the most important question concerns why PDL chert is more common at SDI-812/H in comparison to other sites in the area (see Table 14-4). It has already been argued that the higher percentage of PDL chert in the ranch house assemblage, as well as the rest of SDI-812/H, cannot be explained as a function of distance from source. Other contemporary sites within 1 km of SDI-812/H have far less PDL chert. The next logical place to look for an explanation is in the types of activities that may have occurred at SDI-812/H in comparison to other sites in the area. Were the occupants of SDI-812/H undertaking certain tasks that required the use of tools manufactured out of PDL chert, and were those tasks unique to this site?

High power microwear data (Bamforth 1991; Bamforth et al. 1990; Keeley 1980) from the PDL chert artifacts would best establish their function, but that data is not available. The debate over the reliability of blood residue analysis (Fiedel 1996; Newman et al. 1996) has created such skepticism about this technique that it was not used here, resulting in the reliance of more circumstantial evidence. Based on the range of artifacts recovered from the ranch house and other

portions of SDI-812/H, PDL chert appears to have been used for the manufacture of bifaces and projectile points. While some of the bifaces may have been utilized as tools themselves, many of them appear to be preforms that were originally intended to be transformed into projectile points. Manufacturing errors resulted in these pieces being broken or otherwise rendered unsuitable prior to completion, and they were discarded in a relatively unrefined state. This suggests, therefore, that the occupants of SDI-812/H were using PDL chert to manufacture projectile points, perhaps as replacements for the chert and quartz crystal points that were discarded. In other words, the occupants of SDI-812/H had been hunting, as evidenced by the discarded points, and were gearing up to do more hunting, as evidenced by the debitage and the discarded bifaces. Based on ethnographic observations that most marine mammals were caught using snares or clubs (Hudson and Blackburn 1982; Landberg 1965), it seems most likely that projectile points manufactured or discarded at SDI-812/H were used to hunt terrestrial mammals.

## 14.6 CONCLUSIONS

This analysis has demonstrated that the flaked stone assemblages from the vicinity of the ranch house contain important information about Late Prehistoric flaked stone tool technologies used in the Las Flores Creek Drainage. Like many of the other sites in this drainage, water-worn cobbles obtained from the drainage or in beach lag deposits were used as objective pieces for the creation of expedient flake tools. Unlike the other sites in this drainage, the occupants of the ranch house vicinity used PDL chert in the manufacture of bifaces and projectile points, and this was probably due to the importance of terrestrial mammal hunting in their diet. However, the reliability of that conclusion is hampered by the fact that Late Prehistoric/Protohistoric faunal assemblages in the vicinity of the ranch house have been mixed with historic materials. This mixing makes it difficult to accurately characterize the prehistoric faunal assemblages, and thus gain insights into the functions of the flaked stone artifacts.

# 15 TIZON BROWNWARE AND HISTORIC ARTIFACTS

The Tizon Brownware and the historic artifacts were analyzed by Dr. Judy Berryman in order to identify temporally diagnostic artifacts and to explore the distribution of the cultural material across the site.

## 15.1 TIZON BROWNWARE

Seventy-nine (91.5 g) pieces of Tizon Brownware were recovered from seven of the excavation units (Units 101, 102, 103, 104, 105, 107, & 109) to a maximum depth of 50 cm. All of the prehistoric pottery was identified as Tizon Brownware, which is typical of coastal San Diego County sites. None of the sherds examined exhibited evidence of fiber temper or heavy carbon streaking, typical of brownwares produced during the Mission Period. Although efforts to assign entry dates to Tizon have met with considerable problems, an introductory date of A.D. 1200-1300 is suggested for northern San Diego County (Laylander 1992).

Traditional methods of pottery making were identical to those of other Southern California groups (Rogers 1936). Vessels were built up in coils that were fused together by slapping the outside of a pot with a wooden paddle against a cobble or ceramic anvil. After the pots were dried, they were fired in pits (Sparkman 1908:202), or in open fires (Drucker 1937:22), at relatively low temperatures, for a short duration of time.

Interpretation of the Tizon fragments was difficult given the small size of the sherds, the small number of diagnostic rims, and the difficulty in defining discrete pottery types. Traits proposed to be reflective of Mission Ware include burnishing, slipping, increased surface decoration, thicker vessel walls, roughly finished rims and walls, shaping on a well or by molding, flatter vessel walls, lug handles, "more exaggerated" rims, spouts, multiple-mouthed vessels, emphasis on bowl and cup forms, and more even firing (Laylander 1992). Some of these traits are thought to date from the beginning of the mission period, while others may have first appeared as late as the end of the nineteenth century. The innovations are attributable, variously, to the uses of newly-available technology, to changes in the use of pottery, to changes in the cultural norms, and to the external demands of the tourist trade. Because of small number of sherds collected and the size of individual fragments, none of the above traits were definitively identified.

With the exception of Catalog # 471 (Unit 104, 10-20 cm), no rims or diagnostic pieces were recovered. Based on the curvature of the rim, Catalog # 471 can be identified as a small bowl fragment with some carbon streaking. Food remains, charring, or other evidence of use was not

noted in the remaining pieces. None of the pieces exhibited alteration, repair, or evidence of reuse. All of the fragments were less than 1/4-inch in size, limiting any type of cross-comparison or analysis beyond basic ware and temper. All appear to represent prehistoric Tizon Brownware; evidence of later Mission Ware was not found.

The Tizon Brownware assemblage was recovered from 7 of the 10 excavation units (Table 15-1), although over half of the collection (62 percent) was recovered from Unit 104. Over 90 percent of the sherds were recovered between 0 and 30 cm in depth and none were recovered below 50 cm in depth.

Overall, analysis of the Tizon Brownware was severely hampered by the extreme fragmentation of the collection, limiting any type of analysis beyond basic ware and temper. The samples seem to represent prehistoric wares, not later Mission Ware, although the high fragmentation of the collection makes this conclusion tentative. The Tizon Brownware suggests a prehistoric presence at the site as a whole, but fails to define what activities were carried out (except at a general level), how long these activities were undertaken, or answer questions addressing ethnicity and/or change through time.

**Table 15-1. Distribution of Tizon Brownware at Locus B of SDI-812/H**

| *Unit* | *Level* | *Count* | *Weight (g)* |
|---|---|---|---|
| 101 | 0-10 | 4 | 3.7 |
| 101 | 10-20 | 7 | 4.8 |
| 101 | 20-30 | 3 | 1.1 |
| 101 | 40-50 | 1 | 0.6 |
| 102 | 0-10 | 1 | 0.5 |
| 102 | 40-50 | 1 | 3.4 |
| 103 | 30-40 | 1 | 4.4 |
| 104 | 10-20 | 38 | 44.8 |
| 104 | 20-30 | 8 | 9.2 |
| 104 | 30-40 | 1 | 2.9 |
| 104 | 40-50 | 2 | 1.7 |
| 105 | 10-20 | 1 | 2.1 |
| 105 | 30-40 | 1 | 1.1 |
| 107 | 0-10 | 1 | 1.0 |
| 109 | 0-10 | 4 | 5.1 |
| 109 | 10-20 | 3 | 4.2 |
| 109 | 20-30 | 2 | 0.9 |
| Total | - | 79 | 91.5 |

## 15.2 HISTORIC ARTIFACTS

### Distribution of Historic Material

Historic materials, including glass, ceramic, metal, tile/fired brick, and construction debris, were recovered in each of the ten units to a maximum depth of 70 cm. Distribution of the historic material by weight is provided for the ten units in Table 15-2. In general, low densities of historic artifacts were recovered in Units 103 and 104. Brick and construction related artifacts (cement) dominated the collection in Units 102, 106, and 109. Distribution of ceramics and glass appear to be concentrated in Units 101, 102, 103, 106, and 110. Metal artifacts were concentrated in Units 102

and 106. The higher concentrations of recent cement in Unit 102, along with the recovered ca. 1880s bottle fragments (Catalog #'s 763 and 768) demonstrates the disturbed nature of the depositional history of the site.

Because of the differences in size and density (i.e., metal and tile/brick artifacts weigh considerably more than glass and ceramics), it is difficult to provide percentages by categories. Using weight as a measure of density within the midden, the dominant historic artifact recovered was metal (roughly 3,600 g/60.2 percent) followed by glass (768.2 g/13.1 percent), brick (760.5 g/12.7 percent), construction materials/cement (685 g/11.5 percent) and ceramics (150.4 g/2.5 percent). Although construction-related material was recovered (identified as concrete or cement), no plaster or mortar associated with the fired bricks was identified.

**Table 15-2. Distribution of Historic Material by Unit (weight in grams)**

| *Unit* | *Tile/Brick* | *Construction* | *Ceramics* | *Glass* | *Metal* |
|---|---|---|---|---|---|
| 101 | 50.8 (6.6%) | 0.2 (<0.1%) | 26.5 (17.5%) | 47.8 (6.2%) | 147.2 (4.0%) |
| 102 | 153.9 (20.2%) | 338.4 (49.0%) | 41.3 (27.4%) | 42.4 (5.5%) | 1,157.3 (32.0%) |
| 103 | - | - | 51.5 (34.1%) | - | 147.4 (4.1%) |
| 104 | 2.7 (0.4%) | 2.0 (0.2%) | - | 10.3 (1.3%) | 42.6 (2.0%) |
| 105 | 1.1 (0.2%) | 56.6 (8.3%) | 1.3 (0.7%) | 9.1 (1.1%) | 22.8 (0.5%) |
| 106 | 221.2 (29.0%) | 57.2 (8.3%) | 4.3 (2.7%) | 428.7 (55.8%) | 1,394.3 (38.6%) |
| 107 | 11.2 (1.5%) | 45.6 (6.6%) | 0.2 (0.1%) | 12.2 (1.6%) | 248.2 (6.9%) |
| 108 | 26.6 (3.5%) | 10.5 (1.5%) | - | 18.9 (2.5%) | 59.8 (1.6%) |
| 109 | 239.6 (31.5%) | 108.0 (15.8%) | 2.3 (1.5%) | 14.5 (1.9%) | 185.1 (5.0%) |
| 110 | 53.4 (7.0%) | 66.5 (10.0%) | 23.0 (16.0%) | 184.3 (24.0%) | 195.4 (5.3%) |
| Totals | 760.5 | 685.0 | 150.4 | 768.2 | 3,600.1 |

### Glass

Identification of specific time or function was extremely difficult due to the lack of maker marks and the small size of individual pieces, with the majority less than 1/8-inch in size. Identification by color was completed for the 1/2-inch and 1/4-inch size categories, although the use of color for temporal placement is difficult at best. The lack of bottle seams, lips, or bases prevented reconstruction of whole vessels or estimates for minimal vessel counts.

Approximately 770 grams of glass were cataloged from all ten units. The majority of the glass fragments were recovered from Units 106 (55.8 percent of the total by weight) and 110 (24.0 percent), followed by Unit 101 (6.2 percent), 102 (5.5 percent), 108 (2.5 percent), 109 (1.9 percent). 107 (1.6 percent), 104 (1.3 percent), 105 (1.1 percent), and 103 (1.0 percent). By weight, over 60 percent of the material represented clear window glass. The remaining assemblage consisted of container/bottle fragments (35 percent) and possible laterns/chimney glass (5 percent).

In general, amber or brown glass had a general application, including use for alcoholic beverages, such as beer and whiskey and was common after ca. 1860. Aqua glass had a general and very versatile application and was commonly used in nearly all of the product categories since the introduction of glass bottles. Blue or cobalt glass was used for medicines, cosmetics, soda water and for specialty use from the 1890s to the 1960s. Clear glass had a general application, especially after 1875. Green glass had a general use, including wine and mineral water from ca. 1865 or earlier. Amethyst colored glass was commonly used for medicinal or food products and dates between the 1880s to the early 1920s.

The most common glass color collected from the site (Table 15-3) was clear (associated with windowpanes), followed by amber (containers; beer), a light olive-green (containers; wine bottles), light blue to aquamarine (containers; beverage, soda, food or medicinal products), cobalt blue (medicines, cosmetics, soda water), and amethyst (food or medicinal products). Dark green or "black glass" (suggesting manufacture in the 1800s) and milk glass (medicines, cosmetics, toiletry, food and specialty items from 1890s-1960s) was not recovered.

**Table 15-3. Distribution of Glass Fragments by Unit and Color**

| *Unit* | *Clear* | *Lt. Green* | *Amber* | *Aquamarine* | *Amethyst* | *Cobalt Blue* | *Patina* | *Total (ct)* |
|---|---|---|---|---|---|---|---|---|
| 101 | 119 | - | 21 | 4 | 1 | - | - | 145 (10.0%) |
| 102 | 16 | 2 | 1 | 3 | - | - | 5 | 27 (1.9%) |
| 103 | - | - | 1 | - | - | - | 9 | 10 (0.7%) |
| 104 | 20 | - | 4 | - | - | - | - | 24 (1.7%) |
| 105 | 12 | - | - | - | - | 1 | 3 | 16 (1.1%) |
| 106 | 651 | 5 | 7 | 1 | - | 1 | - | 665 (45.8%) |
| 107 | 15 | 6 | 4 | - | - | - | - | 25 (1.7%) |
| 108 | 29 | 3 | - | - | - | - | 4 | 36 (2.5%) |
| 109 | 26 | 2 | 5 | - | 1 | 1 | 2 | 37 (2.5%) |
| 110 | 466 | - | 1 | - | - | - | - | 467 (32.2%) |
| Total (ct) | 1,354 (93.3%) | 18 (1.2%) | 44 (3.0%) | 8 (0.6%) | 2 (0.1%) | 3 (0.2%) | 23 (1.6%) | 1,452 (100.0%) |

All of the glass from SDI-812/H can be considered late nineteenth century manufacture. Pieces identified as clear (window) and amber glass probably represent modern intrusions or post 1940s glass. Glass that could be considered "older" because of the presence of patina were recovered in Unit 102 (0-10 cm), 103 (10-20 cm), 105 (10-20 cm), 108 (0-10 and 10-20 cm), and 109 (0-10 cm). Although the presence of patina is often used in dating older glass, issues such as soil components, drainage, and general depth can create "patina" on recent glass. If patina was a relative indication of age, the shallow depths of the recovered glass would suggest some mixing within the deposit. Possible fragments of chimney glass were recovered in Unit 105 (30-40 cm) and 107 (10-20 cm). One lip fragment with a partial applied/machine lip (Catalog # 763) was recovered in Unit 102 (40-50 cm). This artifact is aqua blue in color and represents a possible food or medicinal container. Based on the partial seam and lip application, this artifact dates from the mid 1880s to the early 1920s.

Because of the extremely limited and fragmented nature of the assemblage, questions dealing with diet, recreation, use of medicine, manufacturing processes, or cultural change could not be addressed.

### Ceramics

As with the glass, identification of specific time or function was severely limited due to the lack of maker marks, the lack of design motifs, and the extreme fragmentation of the collection. In general, the recovered ceramic fragments were less than 5 cm in length or width, making assignment to a particular functional category (i.e. plate, bowl, saucer, or cup) difficult. Due to the lack of maker's marks, it is not possible to discuss the number or origin of particular items by manufacture. During analysis, an attempt was made to separate the collection into three functional categories: (a) food serving (tableware, cups, bowls, saucers, plates, etc.), (b) food

preparation (crockery, large mixing bowls, etc.), and (c) food-related artifacts (containers). The low density of artifacts (49 fragments at 150.4 g) and the lack of diagnostic pieces, however, prevented classification beyond manufacture wares.

The collection was dominated by white, undecorated earthenware. In addition to the undecorated pieces, four glazed fragments (Unit 109 10-20 cm, Unit 106 10-20 cm, Unit 106, 20-30 cm, Unit 106 40-50 cm) and one piece of porcelain (Unit 105 10-20 cm) were collected. One temporally sensitive ceramic piece was recovered in Unit 102 (0-10 cm). This artifact (Catalog # 768) represented remnants of a salt-glazed wheel thrown stoneware beverage container dating between the 1860-1890s (Wilson 1981: 8-10). None of the remaining pieces were considered temporally sensitive.

Based on color alone, it can be estimated that a minimum of five vessels was represented in the entire assemblage. Size and general configuration of the remaining pieces, however, suggest a minimum of 10 to 15 vessels. Again, because of the size and fragmentation of the entire sample, it was not possible to determine whether or not some of the undecorated earthenware could belong to decorated pieces of transfer ware, painted earthenware and/or annular ware. For this reason, estimates of minimal vessel counts are not accurate.

In addition to the ceramics, a number of pieces representing low-fired clay flower pots were recovered from Units 102, 106, and 109 at depths to 10-20 cm. These pieces represent modern intrusion into the midden deposit.

**Personal Artifacts**

Aside from a shell button recovered between 0-10 cm in Unit 106 (Catalog # 770), a small metal pill box from Auger-134 (Catalog # 66), and a few modern plastic buttons, personal artifacts such as ornaments, combs, pocket tobacco cans, shirt/clothing buttons, buckles, toys, pencils, or ornate objects were not recovered.

**Metal**

The majority of the metal consisted of small, unidentifiable fragments most likely related to construction-related activities. Less than 25 percent of the collection could be identified by function. These artifacts included can fragments, nails, washers, bolts, tacks, and miscellaneous farm equipment. Wire nails dominated the collection (post 1890s) and ranged in size from 4 to 16 penny. None of the nail fragments appeared to be square-cut or hand forged. The largest bulk of the unidentified metal debris was discarded food cans. Because of the condition of the metal, identification of individual can fragments in terms of size or manufacture detail could not made. Discrete lids or evidence of seams were not identified in the consolidated clumps of recovered metal. A recovered metal bottle cap (Unit 107 30-40cm) represents a post 1920s deposition. Remnants of a shoe (Catalog # 750; leather support "Dr Scholl's Ant. . .Metatarsal No. 1") and associated nails were recovered in Unit 106. Based on the condition of the leather, this artifact is post 1950s.

Other functional artifacts included a grommet (Catalog # 452, Unit 106), possible clothing rivets (Catalog #'s 353 and 361, Unit 107; Catalog # 373, Unit 108), shoe eyelets (Catalog # 449, Unit 106), and a small circular steel bead or bearing (Catalog # 637, Unit 104). The clothing and shoe rivets may suggest male work garments. None of these items are considered temporally sensitive. Other related clothing items, such as clips, clasps, hook, and/or clothing snaps were not collected.

Identifiable farm and/or machinery equipment were recovered in Unit 102 (Catalog # 1149, 20-30 cm) and Unit 106 (Catalog # 1139, 10-20 cm). Other artifacts related to machinery was expected but not identified in the assemblage. Nine bullet or shell casings were also recovered, including three .22 rim-fired casings (Units 104/Catalog # 310, Unit 109/Catalog # 495, and Auger 116/Catalog # 167), three 50 caliber military fired rounds from Unit 108 (Catalog # 375) and Unit 106 (Catalog # 451), one shotgun shell from Unit 108 (Catalog # 577), and two miscellaneous bullet or shell casings from Unit 106 (Catalog # 1186) and Auger 120 (Catalog # 86). The military rounds would represent WW II activity while the three .22 casings would represent post 1900s activity.

Several small wire staples, tacks/nails, and wood screws were identified in the collection (ranging in size between 0.5- and 0.88-inch flat heads of 0.31- to 0.38-inch diameter). These artifacts may have served several architectural functions and could have fastened any number of metal hardware parts to wooden walls, cabinets, doors, or trim.

### Tile/Fired Brick

All of the recovered tile and/or fired brick fragments could date to the mid-nineteenth century or later. Identification of individual pieces was hampered by the fragmentation and condition of the collection (the majority less than 1/4-inch in size), and it was not possible to separate floor tile from fired brick. The presence of the tile/fired brick at the site is consistent with the associated structure.

### Construction Debris

Modern construction debris within the assemblage included ceramic sewer/water pipe fragments and pieces of concrete. All but two of the excavation units (Units 103 and 105) contained scattered pieces of cement to a maximum depth of 40 cm. The presence of both the cement and water pipe would indicate modern intrusions into the deposit. None of the concrete could be considered temporally sensitive. Although expected, plaster (historic or modern) was not present in the midden.

## 15.3 SUMMARY

Testing at SDI-812/H recovered a limited assemblage of Tizon Brownware, glass, ceramics, metal, tile/brick, and modern debris. Analysis of the material was severely hampered by the extreme fragmentation of the collection and the paucity of temporally sensitive artifacts. The Tizon Brownware samples seem to represent prehistoric wares, not later Mission Ware, although the high fragmentation of the collection makes this conclusion tentative. Recovery of modern debris in the units, along with impact from the building construction/maintenance, suggests that the area as a whole has been disturbed. The presence of glass, ceramics, metal, and construction materials indicate a historic presence at the site as a whole, but fails to define what activities were carried out (except at a general level), how long these activities were undertaken, or answer questions addressing ethnicity and/or change through time.

# 16 VERTEBRATE FAUNAL ANALYSIS

## 16.1 INTRODUCTION

The vertebrate remains recovered from Locus B of SDI-812/H were identified and analyzed by Dr. Karen Rasmussen in order to address the research issues raised in Chapter 3, including those related to the subsistence practices of the people living around the ranch house during historic and possibly prehistoric times. A brief description of the methods used during analysis is provided below. This is followed by a discussion of the results of the study, which address such issues as the overall diversity of the assemblage, the types of habitats exploited, possible methods of capture, seasonality of the site deposits, and intrasite patterning.

## 16.2 MATERIALS AND METHODS

Over 5,000 fragments of bone, weighing close to 700 g, were recovered during the current testing program at the ranch house. The vertebrate material recovered from the 1/4-inch and 1/8-inch screening of all units was chosen for further identification and analysis. The bone was identified to the most specific taxonomic level possible. Identifications were based on the comparative collection housed at the Repository for Archaeological and Ethnographic Collections at the University of California, Santa Barbara (UCSB). Information, when possible, was recorded on element type, counts, weight (to the nearest 0.01 g), and signs of modification (e.g., cut marks). Scientific nomenclature and habitat information follows various references, including Burt and Grossenheider (1980), Eschmeyer et al. (1983), Jameson and Peeters (1988), Love (1996), Peterson (1990), and Stebbins (1985). The detailed vertebrate catalog is provided in Appendix E.

Some of the mammal bone was identified to the order or genus level; however, most of the mammal bone was highly fragmented, making identification difficult. An attempt was made to place the unidentifiable mammal bone into general size categories, including large mammal (deer size or larger), medium mammal (smaller than deer and larger than jackrabbit), and small mammal (jackrabbit or smaller). A similar attempt was made to separate the bird bone by size, including large bird (goose size or larger), medium bird (smaller than geese and larger than jays), and small bird (jays or smaller).

The identifiable fish bone fragments consisted of vertebrae, otoliths, teeth, jaw fragments, pharyngeals, and dental plates. Although the collection was identified to the most specific taxonomic level possible, many of the remains had to be left at a family level or greater. Some of the remains were too fragmentary to identify with a greater degree of accuracy, and some of the fish elements were simply non-diagnostic to species level. These remains were left as Teleostei (bony fish) or Elasmobranchii (cartilaginous fish). Other remains could not be more precisely identified because of the incomplete nature of the comparative collection. For example, the UCSB

collection does not contain the full range of croaker species for this area; therefore, specimens were labeled as the croaker family, Sciaenidae. A list of the identified taxa from the collection is provided in Table 16-1.

**Table 16-1. Vertebrate Taxa**

AVES (Birds)

**REPTILIA** (Reptiles)
- Order Salentia (Frogs and Toads)

**MAMMALIA**
- Order Artiodactyla (Even-toed Hoofed Mammals)
  - **Bovidae** (Sheep, Goats, Cattle)
    - *Bos taurus* (Domesticated Cow)
- Order Pinnipedia (Sea Lions and Seals)
- Order Carnivora (Flesh-eaters)
  - **Mustelidae** (Weasels, Skunks, etc)
    - cf. *Mustela* spp. (Weasel)
- Order Lagomorpha (Rabbits, Hares, & Pikas)
- Order Rodentia (Gnawing Mammals)
  - **Cricetidae** (Mice, Rats, Lemmings, and Voles)
    - *Peromyscus* spp. (Mouse)
    - *Microtus* spp. (Vole)
  - **Heteromyidae** (Kangaroo Rats, Kangaroo Mice, & Pocket Mice)
    - cf. *Dipodomys* spp. (Kangaroo Rat)
  - **Geomyidae** (Pocket Gophers)
    - *Thomomys bottae* (Southern Pocket Gopher)
  - **Sciuridae** (Squirrels)
    - cf. *Spermophilus beecheyi* (California Ground Squirrel)

**TELEOSTEI**
- Order Perciformes
  - **Carangidae** (Jacks, Amberjacks, Pompanos)
    - *Seriola lalandi* (Yellowtail)
  - **Embiotocidae** (Surfperch)
  - **Labridae** (Wrasses)
    - *Oxyjulis californica* (Señorita)
    - *Semicossyphus pulcher* (California Sheephead)
  - **Sciaenidae** (Croakers)
  - **Scombridae** (Mackerels & Tunas)
    - cf. *Scomber japonicus* (Pacific Mackerel)
  - **Serranidae** (Sea Basses & Groupers)
    - *Paralabrax* spp. (Bass)
  - **Sphyraenidae** (Barracudas)
    - cf. *Sphyraena argentea* (California Barracuda)

**ELASMOBRANCHII**
- **Myliobatididae** (Eagle Rays)
  - *Myliobatis californica* (Bat Ray)

## 16.3 RESULTS

The identified assemblage was composed of 5,144 fragments of animal bone weighing 689.57 g covering 24 mutually exclusive taxa. These include at least nine kinds of mammals, two reptiles, three birds, nine bony fish, and one elasmobranch (Tables 16-2 and 16-3).

Only a small portion of the large mammal fragments was diagnostic to a more specific level, such as domesticated cow and pinniped. The majority of the unidentified large mammal remains consisted of shaft fragments from terrestrial species, and probably belongs to domesticated cow, sheep, and pig. A small number of medium-sized carnivores were identified from this assemblage, including one weasel tooth. The small mammal remains represented a wide range of rodents, including mouse, vole, kangaroo rat, pocket gopher, and ground squirrel. Surprisingly few lagomorphs (rabbits and hares) were identified from this assemblage.

**Table 16-2. Identified Non-Fish Vertebrate Taxa From SDI-812/H, Locus B**

| | 1/4" | | 1/8" | | TOTAL | | |
|---|---|---|---|---|---|---|---|
| *Taxon* | *NISP* | *Weight* | *NISP* | *Weight* | *NISP* | *Weight* | *% Weight* |
| **Aves** | | | | | | | |
| Aves, undif. | 2 | 0.19 | - | - | 2 | 0.19 | 0.03 |
| Aves, large | 3 | 1.72 | 1 | 0.65 | 4 | 2.37 | 0.36 |
| Aves, medium | 3 | 0.17 | 1 | 0.06 | 4 | 0.23 | 0.03 |
| Aves, small | - | - | 6 | 0.09 | 6 | 0.09 | 0.01 |
| **Reptilia** | | | | | | | |
| Reptilia, undif. | 4 | 0.46 | 33 | 1.45 | 37 | 1.91 | 0.29 |
| Salentia | 1 | 0.03 | - | - | 1 | 0.03 | 0.00 |
| **Mammalia** | | | | | | | |
| Mammalia, undif. | 65 | 12.26 | 1,577 | 98.05 | 1,642 | 110.31 | 16.66 |
| Mammalia, large | 423 | 275.24 | 1 | 0.13 | 424 | 275.37 | 41.59 |
| Artiodactyla | 13 | 89.91 | - | - | 13 | 89.91 | 13.58 |
| *Bos taurus* | 3 | 80.40 | - | - | 3 | 80.40 | 12.14 |
| Pinnipedia | 8 | 3.24 | 1 | 0.18 | 9 | 3.42 | 0.52 |
| Mammalia, medium/large | 5 | 1.01 | 6 | 0.44 | 11 | 1.45 | 0.22 |
| Mammalia, medium | 2 | 1.46 | - | - | 2 | 1.46 | 0.22 |
| cf. *Mustela* spp. | - | - | 1 | 0.07 | 1 | 0.07 | 0.01 |
| Mammailia, small/medium | 9 | 1.93 | - | - | 9 | 1.93 | 0.29 |
| Mammalia, small | 30 | 3.68 | 303 | 10.94 | 333 | 14.62 | 2.21 |
| Lagomorpha | 1 | 0.23 | 1 | 0.09 | 2 | 0.32 | 0.05 |
| Rodentia | - | - | 7 | 0.20 | 7 | 0.20 | 0.03 |
| cf. *Dipodomys* spp. | 1 | 0.12 | - | - | 1 | 0.12 | 0.02 |
| *Peromyscus* spp. | 1 | 0.04 | 10 | 0.22 | 11 | 0.26 | 0.04 |
| *Microtus* spp. | 2 | 0.16 | 3 | 0.14 | 5 | 0.30 | 0.05 |
| *Thomomys bottae* | 5 | 0.95 | - | - | 5 | 0.95 | 0.14 |
| cf. *Spermophilus beecheyi* | 1 | 0.13 | - | - | 1 | 0.13 | 0.02 |
| **Vertebrata** | 84 | 9.41 | 2,047 | 66.73 | 2,131 | 76.14 | 11.50 |
| **Total** | 666 | 482.74 | 3,998 | 179.44 | 4,664 | 662.18 | 100.00 |

The reptile remains consisted of thirty-eight vertebral elements. One was identified as a frog or toad (Order Salentia). The rest were left as undifferentiated reptile; however, they probably belong to some type of lizard or snake, not a frog or toad.

The bird bone has not been identified to the species level, but includes at least three distinct taxa based on size. The large bird remains probably belong to domesticated chicken.

The fish (Table 16-3) include yellowtail, surfperch, California sheephead, señorita, croakers, two distinct taxa from the Scombirdae family (probably Pacific mackerel and some type of tuna), bass, possible barracuda, and bat ray. Close to 90 percent of the fish remains were recovered from the 1/8-inch screened material, re-inforcing the importance of fine-mesh screening techniques for the recovery of fish and other small-bodied animals (Hudson et al. 1995, 1996; Shaffer and Sanchez 1994).

**Table 16-3. Identified Fish Assemblage from SDI-812/H, Locus B**

| | | 1/4" | | 1/8" | | TOTAL | | |
|---|---|---|---|---|---|---|---|---|
| *Taxon* | *Habitat*[1] | *NISP* | *Weight* | *NISP* | *Weight* | *NISP* | *Weight* | *% Weight* |
| **Teleostei** | | | | | | | | |
| Teleostei, undif. | V | 38 | 3.90 | 298 | 9.93 | 336 | 13.83 | 50.5 |
| *Seriola lalandi* | V | 1 | 1.70 | - | - | 1 | 1.70 | 6.2 |
| Embiotocidae | NS | 2 | 0.11 | 9 | 0.15 | 11 | 0.26 | 1.0 |
| *Semicossyphus pulcher* | SR | 3 | 0.60 | 8 | 0.75 | 11 | 1.35 | 4.9 |
| *Oxyjulis californica* | SR | - | - | 14 | 0.21 | 14 | 0.21 | 0.8 |
| Sciaenidae | EB/NS | 1 | 0.14 | 87 | 5.50 | 88 | 5.64 | 20.6 |
| Scombridae | OP | 6 | 3.16 | - | - | 6 | 3.16 | 11.5 |
| cf. *Scomber japonicus* | OP | 1 | 0.10 | 2 | 0.05 | 3 | 0.15 | 0.6 |
| *Paralabrax* spp. | SR | 3 | 0.56 | 1 | 0.03 | 4 | 0.59 | 2.25 |
| cf. *Sphyraena agenta* | OP | 1 | 0.16 | 1 | 0.14 | 2 | 0.30 | 1.1 |
| **Elasmobranchii** | | | | | | | | |
| *Myliobatis californica* | SM/NS | - | - | 4 | 0.20 | 4 | 0.20 | 0.7 |
| **Total** | - | 56 | 10.43 | 424 | 16.96 | 480 | 27.39 | 100.0 |

[1] Habitat: EB = estuary and/or bay, SR = shallow rocky bottom, SM = shallow sandy/muddy bottom, NS = undifferentiated nearshore, OP = open surface waters, V = various

### Habitat Exploitation and Method of Capture

Mammals composed over eighty-two percent (excluding undifferentiated vertebrates) of the identified elements, fish close to sixteen percent, reptiles a little over one percent, and bird only half of one percent (Table 16-4).

**Table 16-4. Percentage of Major Vertebrate Class**

| *Taxon* | *1/4" (NISP)* | *1/4" (Weight)* | *1/8" (NISP)* | *1/8" (Weight)* | *Total (NISP)* | *Total (Weight)* |
|---|---|---|---|---|---|---|
| Mammals | 89.2 | 97.3 | 80.4 | 85.2 | 82.3 | 94.8 |
| Birds | 1.3 | 0.4 | 0.3 | 0.6 | 0.5 | 0.5 |
| Reptiles | 0.8 | 0.1 | 1.4 | 1.1 | 1.3 | 0.3 |
| Fish | 8.8 | 2.2 | 17.9 | 13.1 | 16.0 | 4.5 |

*Note:* Percentages exclude Undifferentiated Vertebrates

Most of the mammals identified from the assemblage reflect a mixture of large domesticated species and small rodents. Of the mammal bone from the analyzed assemblage, 18 percent of the fragments belonged to large mammals (77 percent by weight), less than one percent were medium-sized mammals (0.5 percent by weight), approximately 15 percent of the fragments represent small mammals (3 percent by weight), and the rest were considered unidentifiable mammals.

The majority of the large mammal remains probably represents domesticated species and was associated with activities from the historic occupation of the ranch house. In addition, eight large mammal fragments display cut marks from a metal instrument and clearly represent historic and/or modern butchering techniques. It is possible that some of the unidentified large mammal remains may be from non-domesticated species, such as mule deer, and may reflect a pre-ranch house, Luiseño occupation of the site area, but this can not be confirmed at this time. In Southern California, deer were hunted with a variety of techniques including snares, stalk and ambush methods, and sometimes with deer-head disguises (Colten 1993; Hudson and Blackburn 1982).

Marine mammals are present at the site, but are not abundant. Nine bone fragments have been tentatively identified as pinniped teeth and phalanges. Pinnipeds could be captured on the rocks with snares (Hudson and Blackburn 1982) or along beach haulouts with clubs (Landberg 1965).

Although some of the smaller mammals identified from the assemblage, such as the pocket gopher and ground squirrel, were probably incorporated into the site assemblage from post-depositional processes, ethnographic references demonstrate that people in southern California exploited many types of small terrestrial mammals. Rats were caught in pitfall traps and squirrels were caught with baited traps or smoked out of the ground (Hudson and Blackburn 1982). Rabbits could have been hunted with snares and throwing sticks (SAIC 1998) or could have been hunted by large groups in cooperative drives, although this strategy is more common with jackrabbits in arid, open environments.

The fish remains comprise a variety of bony and cartilaginous fish species from various habitats (see Table 16-3). The habitat information was derived from Bowser (1996), Eschmeyer et al. (1983), and U.S. Department of the Interior (MMS 1987). California sheephead, señorita, and bass swim along shallow rocky bottoms, including rocky intertidal and nearshore kelp beds. Croakers and surfperch live in undifferentiated nearshore waters. Pacific mackerel prefer more open, pelagic waters where they swim in large schools near to shore. Barracuda, tunas, and yellowtail also prefer open, nearshore surface waters. Bat rays are very common in sandy and muddy bays and sloughs, but may also be found along rocky bottom and around kelp beds. Overall, the inhabitants of the site were exploiting primarily rocky shore and open water species.

The majority of the fish represented at the site could have been caught with hook and line technology, especially the carnivorous fish such as yellowtail, sheephead, surfperch, bass, croakers, mackerel, and barracuda. Some of the smaller rays may have been captured by hand (Bowser 1996). Ethnohistorical data demonstrate that the Luiseño utilized bone and shell fishhooks and yucca fishing line (McCawley 1995) and nets (Iovin 1963). These implements would have been effective for catching most of the species represented by this collection. In addition, coastal groups used dugout and/or bundled rush canoes (Earle and O'Neil 1994; Harrington 1986; McCawley 1995), which would have allowed the inhabitants access to offshore fishing grounds. It is possible that some of the fish remains may have been associated with the historic occupation of

the ranch house and European-introduced fishing techniques, but it is impossible to differentiate the two assemblages at this time.

**Season of Occupation**

Evidence for season of occupation is limited. The mammal and fish species were, for the most part, available year-round. The presence of pinniped remains may represent summer occupation if such hunting was focussed during the season when fur seals and sea lions were on land in rookeries and easier to kill. Local pinnipeds, such as the California sea lion and the Guadalupe fur seal, would be most easily hunted on land when congregated in nurseries. For the local species, this occurs primarily during the summer, from mid-May to late June for the sea lion and from June to July for the fur seal (Riedman 1990).

Yellowtails are usually a migratory fish, which move from Baja California to the California coast around early winter to late spring; some yellowtail, however, appear to reside off of the coast of Southern California year round (Love 1996). Barracuda move from Baja California to southern California in the late spring and early summer, and some barracuda stay off of the California coast throughout the winter (Love 1996). Eighty-six otoliths were recovered from the analyzed assemblage, demonstrating that future otolith analysis may yield additional seasonality information; however, mixing of the prehistoric and historic deposits through post-depositional processes would make interpretations problematic.

**Intrasite Patterning**

The seven areas excavated during the current testing project contained varying densities and diversities of vertebrate remains (Tables 16-5 and 16-6). Unit 101 yielded 96.97 grams of bone fragments, which accounted for the fourth highest site density (80.81 g/m$^3$). The analyzed remains were represented by seven mutually exclusive taxa, including a reptile, an Artiodactyl, at least two types of rodents, and three species of fish (see Table 16-5 and 16-6). Large mammals accounted for the majority of the remains (84 percent) by weight.

Units 102 and 103, taken together, yielded only 5.37 grams of bone from three different mutually exclusive taxa. These two units contained the lowest density (3.16 g/m$^3$) and diversity of vertebrate remains than any other site area (Table 16-7). Units 102 and 103 also contained the lowest density of shellfish remains (see Table 17-4). The vertebrate assemblage was composed of a small amount of large mammal, small mammal, croaker, and undifferentiated material. The low density and diversity of the cultural deposits from the two units was not surprising considering the disturbed nature of the soil deposits in this area of the site (see Chapter 5 for more details).

Unit 104 contained the highest density and diversity of animal remains in terms of both the vertebrate (see Table 16-7) and invertebrate (see Table 17-4) assemblages. Unit 104 yielded 198.24 grams of animal bone from 17 different taxa, including every identified fish taxa from the collection (see Table 16-6). Approximately sixty-two percent of the Unit 104 assemblage was composed of large mammal and Artiodactyl while a little over ten percent was composed of the various fish taxa. The percentage of fish is high compared to the other units and the overall site deposits. In fact, seventy-five percent of the entire fish collection from the site originated from Unit 104.

Unit 105, 107, and 109, the 2x2 m$^2$ excavation area, yielded 225.55 grams of animal bone from 11 distinct taxa. This assemblage represented the second highest density (132.68 g/m$^3$) of the

**Table 16-5. Distribution of Non-Fish Vertebrate Remains by Excavation Unit (weight in grams)**

| *Taxon* | *Unit 101* | *Unit 102* | *Unit 103* | *Unit 104* | *Unit 105* | *Unit 106* | *Unit 107* | *Unit 108* | *Unit 109* | *Unit 110* |
|---|---|---|---|---|---|---|---|---|---|---|
| **Aves** | | | | | | | | | | |
| Aves, undif. | - | - | - | - | 0.12 | - | 0.07 | - | - | - |
| Aves, large | - | - | - | - | - | 0.39 | - | 1.34 | 0.64 | - |
| Aves, medium | - | - | - | - | - | 0.06 | 0.03 | 0.14 | - | - |
| Aves, small | - | - | - | 0.01 | - | - | - | 0.01 | 0.07 | - |
| **Reptilia** | | | | | | | | | | |
| Reptilia, undif. | 0.06 | - | - | 0.92 | - | - | - | 0.44 | 0.01 | 0.48 |
| Salentia | - | - | - | - | - | - | - | 0.03 | - | - |
| **Mammalia** | | | | | | | | | | |
| Mammalia, undif. | 7.29 | - | - | 14.26 | 1.57 | 3.35 | 34.65 | 10.63 | 6.18 | 32.38 |
| Mammalia, large | 48.17 | 2.29 | 2.12 | 71.87 | 11.85 | 36.03 | 60.59 | 2.88 | 21.03 | 18.54 |
| Artiodactyla | 32.82 | - | - | 50.45 | - | - | 3.89 | 2.08 | - | 0.67 |
| *Bos taurus* | - | - | - | - | 60.85 | - | - | - | 13.42 | 6.13 |
| Pinnipedia | - | - | - | 3.30 | 0.12 | - | - | - | - | - |
| Mammalia, medium/large | - | - | - | 0.44 | - | 0.33 | 0.23 | - | - | 0.45 |
| Mammalia, medium | - | - | - | - | - | 0.60 | - | - | - | 0.86 |
| cf. *Mustela* spp. | - | - | - | - | - | - | - | 0.07 | - | - |
| Mammailia, small/medium | - | - | - | 0.07 | - | - | - | - | 1.47 | 0.39 |
| Mammalia, small | 1.92 | 0.05 | - | 2.85 | 0.03 | 0.52 | 0.99 | 1.91 | 0.81 | 5.54 |
| Lagomorpha | - | - | - | - | - | - | - | - | 0.09 | 0.23 |
| Rodentia | - | - | - | 0.01 | 0.07 | 0.10 | - | - | 0.02 | - |
| cf. *Dipodomys* spp. | - | - | - | 0.12 | - | - | - | - | - | - |
| *Peromyscus* spp. | - | - | - | - | 0.03 | - | 0.03 | 0.10 | 0.07 | 0.03 |
| *Microtus* spp. | 0.09 | - | - | 0.07 | 0.02 | - | - | 0.09 | 0.03 | - |
| *Thomomys bottae* | - | - | - | 0.08 | - | 0.67 | - | - | - | 0.20 |
| cf. *Spermophilus beecheyi* | 0.13 | - | - | - | - | - | - | - | - | - |
| **Vertebrata** | 5.15 | 0.77 | - | 33.24 | 0.93 | 2.63 | 1.46 | 9.06 | 2.17 | 20.73 |
| **Total** | 95.63 | 3.11 | 2.12 | 177.69 | 75.59 | 44.68 | 101.94 | 28.78 | 46.01 | 86.63 |

**Table 16-6. Distribution of Fish Remains by Excavation Unit (weight in grams)**

| *Taxon* | *Unit 101* | *Unit 102* | *Unit 103* | *Unit 104* | *Unit 105* | *Unit 106* | *Unit 107* | *Unit 108* | *Unit 109* | *Unit 110* |
|---|---|---|---|---|---|---|---|---|---|---|
| **Teleostei** | | | | | | | | | | |
| Teleostei, undif. | 1.08 | - | - | 9.23 | 0.23 | 0.13 | 0.32 | 2.06 | 0.47 | 0.31 |
| *Seriola lalandi* | - | - | - | 1.70 | - | - | - | - | - | - |
| Embiotocidae | - | - | - | 0.26 | - | - | - | - | - | - |
| *Semicossyphus pulcher* | - | - | - | 0.97 | - | - | - | - | - | 0.38 |
| *Oxyjulis californica* | 0.02 | - | - | 0.19 | - | - | - | - | - | - |
| Sciaenidae | 0.21 | 0.14 | - | 4.85 | - | - | 0.15 | - | 0.29 | - |
| Scombridae | - | - | - | 2.61 | - | - | 0.55 | - | - | - |
| cf. *Scomber japonicus* | - | - | - | 0.02 | - | - | - | 0.13 | - | - |
| *Paralabrax* spp. | 0.03 | - | - | 0.56 | - | - | - | - | - | - |
| cf. *Sphyraena agenta* | - | - | - | 0.14 | - | - | - | 0.16 | - | - |
| **Elasmobranchii** | | | | | | | | | | |
| *Myliobatis californica* | - | - | - | 0.02 | - | - | - | - | - | 0.18 |
| **Total** | 1.34 | 0.14 | - | 20.55 | 0.23 | 0.13 | 1.02 | 2.35 | 0.76 | 0.87 |

different excavation areas (see Table 16-7) and, along with Unit 108, the second highest diversity of vertebrate remains. In addition, Units 105 and 109 contained the majority of the identified domesticated cow fragments from the site.

Units 106 and 108 had relatively low densities of faunal remains when compared to the other areas excavated at the site (see Table 16-7). Unit 106 contained 44.81 grams of animal bone, representing 6 mutually exclusive taxa while Unit 108 yielded 31.13 grams from 11 mutually exclusive taxa. Both units contained large bird vertebra, which were probably from domesticated chickens.

Unit 110 contained a moderate density of faunal material (109.38 g/m$^3$). The assemblage covered 8 mutually exclusive taxa, including a reptile, domesticated cow, an unidentified medium-sized mammal, a lagomorph, two types of rodents, and two species of fish.

**Table 16-7. Summary Data of Vertebrate Remains by Excavation Area**

| *Excavation Area* | *Excavated Volume (m$^3$)* | *Weight (g)* | *Density (g/m$^3$)* | *Number of Mutually-Exclusive Taxa (Richness)* | *% Burned (NISP)* |
|---|---|---|---|---|---|
| Unit 101 | 1.2 | 96.97 | 80.81 | 7 | 3.10 |
| Unit 102, 103 | 1.7 | 5.37 | 3.16 | 3 | 15.08 |
| Unit 104 | 1.1 | 198.24 | 180.22 | 17 | 12.90 |
| Unit 105, 107, 109 | 1.7 | 225.55 | 132.68 | 11 | 36.00 |
| Unit 106 | 0.7 | 44.81 | 64.01 | 6 | 17.50 |
| Unit 108 | 0.6 | 31.13 | 51.88 | 11 | 22.58 |
| Unit 110 | 0.8 | 87.5 | 109.38 | 8 | 14.42 |

## 16.4 SUMMARY AND INTEGRATION

The overall impression of the analyzed sample from Locus B of SDI-812/H is that of a mixed assemblage, part of which is associated with the historic occupation of the ranch house and part of which is possibly associated with a Late Prehistoric/Ethnohistoric (pre-ranch house) assemblage representing an indigenous Luiseño subsistence pattern. The historic assemblage is characterized by European-introduced domesticated species and evidence of metal cut-marks on some of the large mammal fragments. Although only a few of the mammal elements have been positively identified as domesticated cow, the majority of the unidentified large mammal remains consisted of shaft fragments from terrestrial species, and probably belongs to domesticated cow, sheep, and pig. In addition, the undifferentiated large bird remains probably belong to domesticated chicken.

The rest of the assemblage is composed of primarily small rodents and fish along with a small amount of lagomorphs, pinnipeds, reptiles, and birds. It is possible that some of the unidentified large mammal remains may represent mule deer or some other type of non-domesticated species, but this could not be confirmed due to the high fragmentation of the collection and the sparseness of diagnostic elements. One mule deer element, however, was identified from the 1995 excavations at Locus B (see Chapter 6).

The question remains as to how much of the faunal material, if any, represents a pre-ranch house occupation of the area by the Luiseño. The presence of flaked stone tools, Tizon Brownware, and the radiocarbon dates from Locus B suggest that a Late Prehistoric or Ethnohistoric occupation may have existed in the area. The types of fish recovered from the site represent many of the same species recovered from other Luiseño sites located in the Las Flores Drainage, such as SDI-811,

-10,726, -10,728 (ASM Affiliates 1996, 1997; SAIC 1998). The fish remains, therefore, would be consistent with a Luiseño occupation. If a Late Prehistoric/Ethnohistoric assemblage is present at Locus B, it is surprising how few lagomorph remains (rabbits and hares) were identified from the collection because previous studies of coastal sites in northern San Diego County have demonstrated that small game such as rabbit played a relatively equal role with fish and deer (SAIC 1998).

An examination was made of the basic faunal categories by depth in order to try to differentiate the historic component from the possible Late Prehistoric/Ethnohistoric assemblage. If the historic component was contained primarily in the upper deposits of the site and the pre-ranch house component in the lower reaches of the site, then it might be possible to separate the faunal remains from the two components. The vertical distribution of the basic faunal categories is provided in Table 16-8. Unfortunately, most of the animal remains were recovered between 10 and 40 cm in depth, regardless of animal taxon. In addition, known historic remains, such as the domesticated cow, were found to a depth of 50 cm. The cultural deposits at the site, therefore, appear to be mixed together, and the faunal material can not be differentiated by time period.

**Table 16-8. Distribution of Faunal Category by Depth (Percentages based on NISP)**

| *Taxon* | *0-10 cm* | *10-20 cm* | *20-30 cm* | *30-40 cm* | *40-50 cm* | *50-60 cm* | *60-70 cm* | *70-80 cm* | *Total* |
|---|---|---|---|---|---|---|---|---|---|
| Large Mammal | 12.3 | 41.0 | 27.4 | 15.0 | 2.9 | 1.1 | - | 0.2 | 100% |
| Medium Mammal | 33.3 | - | - | - | 33.3 | 33.3 | - | - | 100% |
| Small Mammal | 16.4 | 24.1 | 22.3 | 18.8 | 6.4 | 6.2 | 5.1 | 0.8 | 100% |
| Pinniped | - | 55.6 | 22.2 | 22.2 | - | - | - | - | 100% |
| Undif. Mammal | 5.6 | 30.2 | 27.1 | 21.8 | 6.2 | 2.3 | 4.8 | 2.1 | 100% |
| Fish | 0.8 | 28.5 | 39.8 | 22.9 | 6.9 | 0.4 | 0.2 | 0.4 | 100% |
| Reptile | 2.7 | 21.6 | 27.0 | 24.3 | 10.8 | 5.4 | 2.7 | 5.4 | 100% |
| Bird | 37.5 | 12.5 | 31.3 | 18.8 | - | - | - | - | 100% |
| Bone, undif. | 8.5 | 30.5 | 27.3 | 13.8 | 10.9 | 5.0 | 2.0 | 2.0 | 100% |

# 17 INVERTEBRATE FAUNAL ANALYSIS

## 17.1 INTRODUCTION

The invertebrate remains from the current testing project at SDI-812/H were analyzed by Dr. Karen Rasmussen in order to address the issues raised in Chapter 3, especially those questions concerning the subsistence practices of people living in the area during historic and possibly prehistoric times. The invertebrate remains from the 1/4-inch screen residue from the ten test units were identified and analyzed to the most specific level possible. The results of this study are provided below, including a discussion of habitat exploitation and intrasite patterning.

## 17.2 MATERIALS AND METHODS

Approximately 11,400 grams of invertebrate remains were recovered from the 1/4-inch fraction and 4,800 grams from the 1/8-inch fraction during the excavation of ten test units at Locus B of SDI-812/H. All of the 1/4-inch invertebrate remains were identified to the most specific taxonomic level possible. Weights, Minimum Number of Individuals (MNI), and signs of modification were noted and recorded. The material smaller than the 1/4-inch screen mesh were not identified because it would bias the sample toward those shell species whose tiny fragments are easily identified (e.g., *Donax gouldii*), while it would not greatly change the MNI counts for any of the shellfish species.

Identifications and habitat information were derived from shellfish comparative collections housed at the Santa Barbara office of SAIC as well as various references such as *A Field Guide to Pacific Coast Shells* (Morris 1980) and the *Intertidal Invertebrates of California* (Morris et al. 1980). Most of the shellfish remains were identified to at least the genus level. Some of the invertebrate remains, however, were designated as Veneridae (Venus clam), Pectinidae (scallop), Chamidae (Jewel Box), Cardiidae (Cockle) Mytilidae (Mussel), Polyplacophora (Chiton), Gastropoda (univalve), or undifferentiated shell when the fragments were either too fragmentary or too weathered for a more specific identification. Two specimens listed as "Gastropod, undif." are probably a type of *Nassarius* (Dog Whelk). In addition, crabs (Decapoda) were not differentiated to a more specific level due to the lack of a comprehensive comparative collection. Identified taxa are listed in Table 17-1.

MNI values were calculated for the site, as a whole. Calculations were based on the number of apices or columns present for the gastropods, the higher number of left and right valves for the pelecypods, and the number of chiton plates divided by eight. No MNI determinations were made for the crustaceans (e.g., crab and barnacles). Weights were recorded to the nearest 0.01 gram. The detailed invertebrate catalog is provided in Appendix F.

**Table 17-1. Invertebrate Taxa**

PHYLUM MOLLUSCA
- Class Gastropoda
  - **Acmaeidae** (Limpets)
    - *Acmaea* spp. (Limpet)
  - **Haliotidae** (Abalones)
    - *Haliotis* spp. (Abalone)
  - **Olividae** (Olive Shells)
    - *Olivella biplicata* (Purple Olive)
  - **Potamididae** (Horn Shell)
    - *Cerithidea californica* (California Horn Shell)
- Class Pelecypoda
  - **Cardiidae** (Cockles)
  - **Chamidae** (Jewel Boxes)
    - *Pseudochama exogyra* (Reversed Jewel Box)
  - **Donacidae** (Bean Clams)
    - *Donax gouldii* (Little Bean Clam)
  - **Mytilidae** (Mussels)
    - *Mytilus californianus* (California Mussel)
    - *Septifer bifurcatus* (Platform Mussel)
  - **Pectinidae** (Scallops)
  - **Veneridae** (Venus Clams)
    - *Chione* spp. (Venus Clam)
    - *Saxidomus nuttalli* (Washington Clam)
    - *Tivela stultorum* (Pismo Clam)
- Class Polyplacophora (Chiton)

PHYLUM ARTHROPODA
- Class Crustacea
  - Subclass Malacostraca
    - Order Decapoda (Crab)
  - Subclass Cirripedia (Barnacles)
    - *Balanus* spp. (Barnacle)

## 17.3 RESULTS

The analyzed invertebrate collection weighs a total of 11,407.69 grams and contains seventeen mutually exclusive taxa (Table 17-2). Although the assemblage contains a wide diversity of shell taxa, the Little Bean Clam (*Donax gouldii*) clearly dominates the collection in terms of percentage of overall weight (97.1 percent) and MNI (99.9 percent). California Mussel (*Mytilus californianus*) accounts for a little over 2 percent of the assemblage by weight. All other taxa represent less than 1 percent of the entire assemblage by weight or MNI.

**Table 17-2. Analyzed Invertebrate Assemblage from SDI-812/H, Locus B**

| *Taxon* | *Habitat*[1] | *Tidal Range*[2] | *Faunal Type*[3] | *Weight (g)* | *Weight (%)* | *MNI (ct)* | *MNI (%)* |
|---|---|---|---|---|---|---|---|
| **Gastropoda** | | | | | | | |
| Gastropod, undiff. | V | - | E | 0.47 | 0.004 | - | - |
| *Acmaea* spp. | R | L | E | 0.02 | 0.000 | 1 | 0.005 |
| *Haliotis* spp. | R | B | E | 0.54 | 0.005 | 1 | 0.005 |
| *Olivella biplicata* | N/B/E | L | I | 1.21 | 0.011 | 2 | 0.009 |
| *Cerithidae californica* | B/E | U | I | 0.10 | 0.001 | 1 | 0.005 |
| **Pelecypoda** | | | | | | | |
| Cardiidae | B/E | L | I | 3.91 | 0.034 | 1 | 0.005 |
| Chamidae | R/B | B | E | 0.37 | 0.003 | - | - |
| *Pseudochama exogyra* | R | U | E | 0.35 | 0.003 | 1 | 0.005 |
| *Donax gouldii* | N | U | I | 11,079.20 | 97.120 | 21,893 | 99.854 |
| Mytilidae | R/B | B | E | 0.40 | 0.004 | - | - |
| *Mytilus californianus* | R | B | E | 248.40 | 2.177 | 15 | 0.068 |
| *Septifer bifurcatus* | R/B | L | E | 0.29 | 0.003 | 1 | 0.005 |
| Pectinidae | B/E | B | I | 2.20 | 0.019 | 1 | 0.005 |
| Veneridae | V | B | I | 7.84 | 0.069 | - | - |
| *Chione* spp. | B/E | L | I | 14.93 | 0.131 | 2 | 0.009 |
| *Saxidomus nuttalli* | N/R/B | L | I | 6.99 | 0.061 | 1 | 0.005 |
| *Tivela stutiorum* | N | B | I | 11.60 | 0.102 | 2 | 0.009 |
| **Other Invertebrates** | | | | | | | |
| Chiton, undiff. | R | B | E | 4.68 | 0.041 | 1 | 0.005 |
| Decapoda | V | B | E | 12.14 | 0.106 | - | 0.005 |
| *Balanus* spp. | V | - | - | 0.28 | 0.002 | - | 0.005 |
| Shell, undiff. | V | - | - | 11.77 | 0.103 | - | - |
| **Total** | - | - | - | 11,407.69 | - | 21,923 | - |

*Notes:* 1. Habitat: R = exposed rocky shores; N = exposed nonrocky shores; B = bays; E = estuaries; V = various habitats
2. Tidal Range: U = upper (includes middle zone); L = lower (includes subtidal zone); B = both upper and lower
3. Faunal Type: E = epifauna (on rocks or other shells); I = infauna (burrowing)

## Habitat Exploitation

The shellfish species found at the site originate from a variety of habitat settings (Table 17-2). Following ASM Affiliates (1996), Brian F. Mooney Associates (1995), Cerreto (1988), Morris et al. (1980), and SAIC (1998), habitats were divided into four general categories: (1) exposed rocky shore, which includes shorelines with large rock outcrops in association with mud, sand, cobbles, and/or shell fragments; (2) exposed non-rocky shores, which includes shorelines composed of any of the above substrates, but without large rocky outcrops; (3) bays, which are defined as protected bays composed of any combination of the above habitats; and (4) estuaries, which include marine-dominated estuaries featuring extensive sand and mud flats exposed at low tides. The tidal ranges have been lumped into two general categories consisting of the upper tidal range (uppermost splash zone, upper intertidal, and middle intertidal) and the lower tidal range (lower intertidal and subtidal). The intertidal is exposed during low tides while the subtidal is never exposed to the

open air. Note that specific invertebrate animals may thrive in more than one habitat and tidal range.

Little Bean clams (*Donax gouldii*) are found on sandy marine beaches from the middle intertidal zone to 30 m in depth (Reddy 1996). This small clam usually can be found in a narrow band within the intertidal zone and is prevalent in the nearby beach areas located at the mouth of Las Flores Creek. Little Bean clams are subject to population explosions, referred to as resurgent populations, when the number of clams increase to as much as 20,000 per square meter (Reddy 1996). Although these clams offer only a small food package, they are easy to collect and process. The Little Bean clams could have acted as a dietary supplement to the hunter/gatherer groups living in the area and may even have become a critical staple during resurgent years (see Reddy 1996 for more details about the ecology and behavior of *Donax gouldii*).

California Mussel is one of the most common invertebrates on the rocky coast of California and can be found attached to surf-exposed rocks within the uppermiddle intertidal zone (Morris et al. 1980). The Venus clam (*Chione* spp.) prefers bay and estuary habitats, the Washington clam (*Saxidomus nuttalli*) can be found along bays and lagoons as well as sandy areas near rocks on the outer coast, and the Pismo clam (*Tivela stultorum*) lives within sandy substrates. The rest of the taxa come from a combination of rocky shore and bay/estuary habitats.

Overall, the shellfish assemblage indicates a pronounced emphasis on the exploitation of sandy shore invertebrates. Residents also exploited bays, marine estuaries, and rocky shores, but to a much lesser extent. The emphasis on sandy shore species such as *Donax* is not surprising because the closest and most accessible beach habitat to the site (Red Beach at the mouth of Las Flores Creek) is one of the largest sandy beach habitats on Camp Pendleton.

**Intrasite Patterning**

The seven excavation areas contained varying densities and diversities of shellfish remains. Unit 101 yielded 1,065.64 grams of analyzed shell — the second highest in density (888.03 g/m$^3$) — represented by six mutually exclusive taxa (Tables 17-3 and 17-4). *Donax* comprised over 95 percent of the total shell by weight (see Table 17-4). The unit is characterized by a unimodal vertical distribution, with most of the shellfish remains concentrated between 10 to 40 cm below the surface.

Units 102 and 103, comprising the second excavation area, yielded 11.71 grams of invertebrate remains from five different mutually exclusive taxa. The two units contained the lowest density of shellfish (6.89 g/m$^3$) of all the different excavation areas. The assemblage was composed primarily of *Donax* (39 percent), Cardiidae (33 percent), and *Mytilus californianus* (20 percent), and most of the remains were recovered from between 0 and 40 cm below the surface.

Unit 104 contained the highest density of shellfish material (8,519.75 g/m$^3$) as well as the most diverse assemblage of the seven different excavation areas. Unit 104 yielded over 9,000 grams of analyzed shellfish from 13 different taxa (see Table 17-3 and 17-4.). The assemblage was dominated by *Donax* remains, which accounted for over 97 percent of the collection. Unit 104 also contained the only recovered specimens of *Acmaea*, *Cerithidae*, *Septifer*, and *Saxidomus*. Most of the remains were recovered between 10 and 50 cm below the surface, with highest concentrations of material between 10 and 30 cm.

**Table 17-3. Distribution of Analyzed Shellfish by Excavation Unit**

| *Taxon* | *Unit 101 (g)* | *Unit 102 (g)* | *Unit 103 (g)* | *Unit 104 (g)* | *Unit 105 (g)* | *Unit 106 (g)* | *Unit 107 (g)* | *Unit 108 (g)* | *Unit 109 (g)* | *Unit 110 (g)* |
|---|---|---|---|---|---|---|---|---|---|---|
| **Gastropoda** | | | | | | | | | | |
| Gastropod, undiff. | — | — | — | 0.32 | 0.15 | — | — | — | — | — |
| *Acmaea* spp. | — | — | — | 0.02 | — | — | — | — | — | — |
| *Haliotis* spp. | — | 0.41 | — | — | — | — | — | — | — | 0.13 |
| *Olivella biplicata* | 0.63 | — | — | 0.58 | — | — | — | — | — | — |
| *Cerithidae californica* | — | — | — | 0.10 | — | — | — | — | — | — |
| **Pelecypoda** | | | | | | | | | | |
| Chamidae | — | — | — | — | 0.37 | — | — | — | — | — |
| *Pseudochama exogyra* | — | — | — | — | — | — | 0.35 | — | — | — |
| Cardiidae | — | 3.91 | — | — | — | — | — | — | — | — |
| *Donax gouldii* | 1,021.78 | 3.71 | 0.86 | 9,174.37 | 144.88 | 10.44 | 59.14 | 306.71 | 295.80 | 61.51 |
| Mytilidae | — | — | — | — | — | — | — | — | 0.40 | — |
| *Mytilus californianus* | 38.87 | — | 2.40 | 165.47 | 6.78 | 7.85 | 11.17 | 2.75 | 12.95 | 0.16 |
| *Septifer bifurcata* | — | — | — | 0.29 | — | — | — | — | — | — |
| Pectinidae | — | — | — | 1.36 | — | — | 0.84 | — | — | — |
| Veneridae | 0.92 | 0.25 | — | 2.94 | 0.37 | — | — | 0.98 | — | 2.38 |
| *Chione* spp. | 1.45 | — | — | 5.27 | — | — | — | 8.21 | — | — |
| *Saxidomus nuttalli* | — | — | — | 6.99 | — | — | — | — | — | — |
| *Tivela stultorum* | 0.87 | — | — | 6.13 | 2.92 | — | — | — | 1.68 | — |
| **Other Invertebrates** | | | | | | | | | | |
| Chiton, undiff. | 0.73 | — | — | 3.20 | — | — | — | — | 0.75 | — |
| Decapoda | — | — | — | 0.14 | — | — | — | — | 12.00 | — |
| *Balanus* spp. | — | — | — | — | — | — | — | 0.28 | — | — |
| Shell, undiff. | 0.39 | — | 0.17 | 4.55 | 0.76 | 0.15 | — | 3.11 | 1.82 | 0.82 |
| **Total** | 1,065.64 | 8.28 | 3.43 | 9,371.73 | 156.23 | 18.44 | 71.50 | 322.04 | 325.40 | 65.00 |

**Table 17-4. Summary Data of Invertebrate Remains by Excavation Area**

| *Excavation Area* | *Excavated Volume ($m^3$)* | *Weight (g)* | *Density ($g/m^3$)* | *Number of Mutually-Exclusive Taxa (Richness)* | *% of Donax*[1] |
|---|---|---|---|---|---|
| Unit 101 | 1.2 | 1,065.64 | 888.03 | 6 | 95.88 |
| Unit 102, 103 | 1.7 | 11.71 | 6.89 | 5 | 39.03 |
| Unit 104 | 1.1 | 9,371.73 | 8,519.75 | 13 | 97.89 |
| Unit 105, 107, 109 | 1.7 | 553.13 | 325.37 | 8 | 90.36 |
| Unit 106 | 0.7 | 18.44 | 26.34 | 2 | 56.62 |
| Unit 108 | 0.6 | 322.04 | 536.73 | 4 | 95.24 |
| Unit 110 | 0.8 | 65.00 | 81.25 | 4 | 94.63 |

[1] % of *Donax* equals the weight of *Donax* remains divided by the total shell weight per excavation area

Unit 105, 107, and 109, which formed a 2x2 $m^2$ excavation area, yielded 553.13 grams of shellfish from 8 distinct taxa. This assemblage represented the third highest density (325.37 $g/m^3$) of the different excavation areas. *Donax* comprised 90 percent of the shellfish remains (see Table 17-4). This excavation area yielded the only example of *Pseudochama* recovered from the site. Shellfish were recovered from all excavated levels, with highest concentrations between 10 and 30 cm in depth.

Only a small amount of shellfish (18.44 grams) was recovered from Unit 106, making this the second lowest density of shell from the site. *Donax* comprised 56.6 percent of the collection, *Mytilus* 42.6 percent, with trace amounts of unidentified shell. Most of the material was recovered between 10 and 40 cm below the surface.

Unit 108 yielded 322.04 grams of invertebrate remains, representing the third highest density of shell (see Table 17-4). Although the assemblage contained four distinct taxa, ninety-five percent of the assemblage was *Donax*. The highest concentrations of material were recovered from between 30 and 50 cm in depth.

Finally, 65 grams of shellfish, representing four distinct taxa, were recovered from Unit 110. Of the 65 grams, 95 percent were identified as *Donax*. The highest concentrations of invertebrate material were recovered between 0 and 30 cm in depth.

## 17.4 SHELL ARTIFACTS

Forty-two shell beads were recovered from Unit 104 between 10 and 30 cm in depth. All of the beads were identical in shape (Figure 17-1) and ranged in size from approximately 7.2 mm in diameter and 2.4 mm in thickness to 3.8 mm in diameter and 1.3 mm in thickness. They were made from the barrel of some type of small gastropod after the spires and bases were ground down. The callus, columella and biplicata folds have not been removed through grinding, as is usually done with *Olivella* Barrel beads (Gibson 1992).

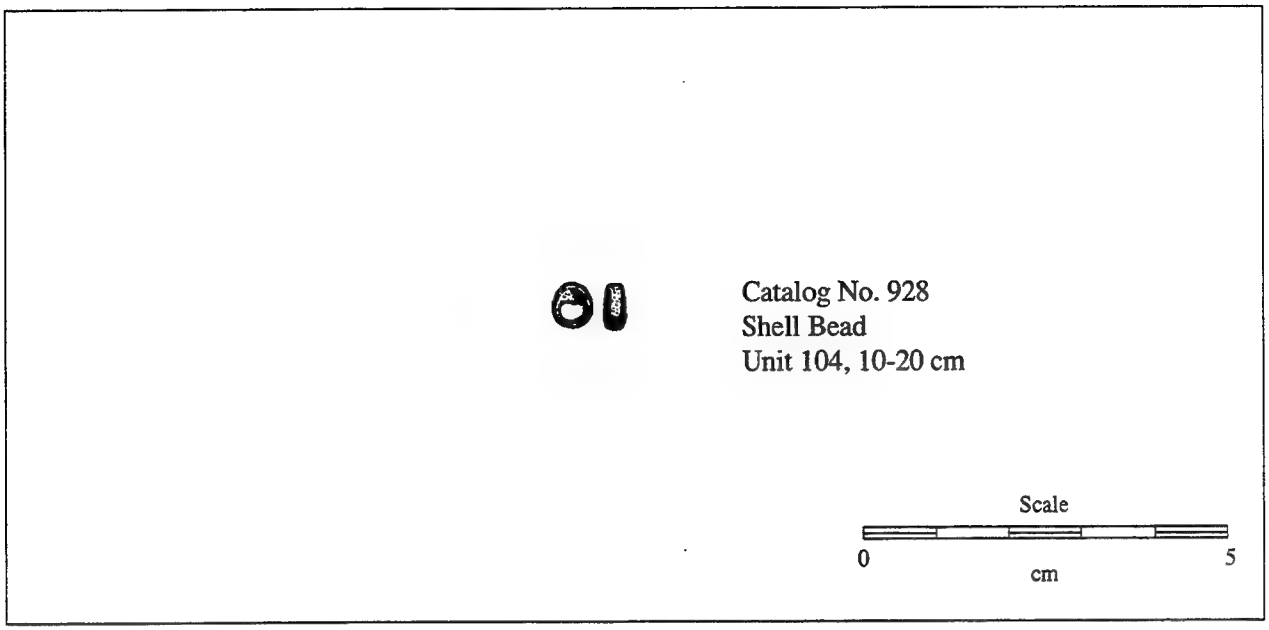



**Figure 17-1. Shell Bead from Locus B**

## 17.5 Summary and Integration

The assemblage from Locus B of SDI-812/H is clearly dominated by *Donax* remains, comprising over 97 percent of the assemblage by weight and over 99 percent by MNI counts. This pattern is not unique. Previous excavations at SDI-812/H as well as excavations at SDI-4538, -10728 (Locus B), and -10726 (Locus A) have uncovered shellfish assemblages composed of over 98 percent *Donax* (SAIC 1998). Many of the sites located in the Las Flores Creek and Horno Canyon (versus the larger drainages to the north) and dating after the beginning of the Late Holocene tend to be dominated by *Donax* remains (SAIC 1998). It has been suggested that the Las Flores Creek and Horno Canyon drainages probably developed sandy-shore habitats preferred by the Little Bean clam during the Late Holocene (ASM Affiliates 1997), which accounts for the rise of *Donax* remains in the archaeological assemblages dating after the end of the Middle Holocene.

It is unclear whether the shellfish remains from Locus B reflect a Late Prehistoric/Ethnohistoric occupation prior to the construction of the ranch house or whether people associated with the ranch house operations were also collecting and eating Little Bean clams and other types of shellfish species. If two temporal components exist at Locus B, which seems likely based on the radiocarbon dates (pre-ranch house) in conjunction with the presence of domesticated cow and other historic material (post-European contact), then it is impossible to differentiate the shellfish material by time period because the cultural deposits from the two time periods have been mixed together.

# 18 CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS

## 18.1 SITE OVERVIEW AND INVENTORY RESULTS

Forty auger holes and ten excavation units were excavated in January 1998 in order to define the nature, structure, and research potential of the area around the perimeter of the historic Las Flores Adobe Ranch House. No auger hole or test unit was completely sterile, demonstrating that cultural material exists throughout the tested area surrounding the ranch house, albeit in varying densities. Most of the cultural material was recovered between 0 and 30 centimeters in depth, and included flaked stone material, Tizon Brownware, faunal material, fire-affected rock, glass, ceramics, metal, tile/brick, and modern debris.

The radiocarbon samples from Locus B demonstrate the existence of a pre-ranch house occupation of the site area and reflect a Late Prehistoric/Ethnohistoric time frame. Temporally diagnostic artifacts from Locus B, such as domesticated cow, glass bottles and ceramic fragments from the late 1800's, and World War II bullet casings, represent activities from historic and modern times. The site deposits in Locus B, therefore, contain a mixture of two temporal components, one associated with a Late Prehistoric/Ethnohistoric occupation and one associated with the historic occupation of the ranch house. Unfortunately, the cultural deposits from the two temporal components are thoroughly mixed together.

The flake stone assemblage represented a combination of expedient flake tools made from water-worn cobbles and the manufacture of bifaces and projectile points from PDL chert. SDI-812/H had the highest percentage of PDL chert of the tested sites in the Las Flores Creek Drainage, although it is unclear at this time why PDL chert was found in such high quantities at this site and not other contemporaneous sites in the area.

Analysis of the Tizon Brownware and the historic material was severely hampered by the extreme fragmentation of the collection and the paucity of temporally sensitive indicators. The Tizon Brownware samples were highly fragmented, limiting any type of analysis beyond basic ware and temper. They seem to represent prehistoric wares, not later Mission Ware, although the high fragmentation of the collection makes this conclusion tentative. The presence of glass, ceramics, metal, and construction materials indicate a historic presence at the site as a whole, but fails to define what activities were carried out (except at a general level), how long these activities were undertaken, or answer questions addressing ethnicity and/or change through time.

The vertebrate assemblage had 5,144 fragments of animal bone covering 24 mutually exclusive taxa, including at least nine kinds of mammals, two reptiles, three birds, nine bony fish, and one elasmobranch. Some of the remains, such as the domesticated cow fragments and the elements with metal cut marks, were directly associated with historic and/or modern times. The majority of the unidentified large mammal consisted of shaft fragments from terrestrial species, and probably belongs to domesticated cow, sheep, and pig. The rest of the assemblage was composed of small rodents and fish along with a small amount of lagomorphs, pinnipeds, reptiles, and birds. The vertebrate remains from Locus B represent a mixed historic and prehistoric assemblage, and it was impossible to separate the two temporal components.

The analyzed invertebrate assemblage weighs a total of 11,407.69 grams and represents seventeen mutually exclusive taxa. The assemblage is clearly dominated by *Donax* remains, which comprise over 97 percent of the assemblage by weight and over 99 percent by MNI counts. It is unclear whether the shellfish remains from Locus B reflect a Late Prehistoric/Ethnohistoric occupation prior to the construction of the ranch house or whether people associated with the ranch house operations were also collecting and eating Little Bean clams because it was impossible to differentiate the shellfish by time period.

Overall, the excavations around the ranch house demonstrate that site integrity is relatively poor in Locus B. The units closest to the ranch house—Units 102, 103, and 110—contain the most severely disturbed cultural deposits. Modern material was recovered from all excavation units up to a depth of 80 cm. In addition, prehistoric, historic, and modern material is mixed together in most, if not all, of the cultural deposits. The presence of modern debris throughout the soil deposits, extensive signs of bioturbation from all units, and the mixture of historic with prehistoric cultural material demonstrate that soil mixing has been fairly severe. Soil mixing has been caused by rodent and tree root disturbance, historic and modern plowing, ranch house construction-related activities, and modern military and Boy Scout use.

## 18.2 NRHP ELIGIBILITY DETERMINATION FOR TESTED PORTIONS OF THE ARCHAEOLOGICAL COMPONENT ASSOCIATED WITH THE LAS FLORES ADOBE RANCH HOUSE

The primary goal of the testing project was to evaluate the NRHP-eligibility of a portion of the archaeological deposit (Locus B) that surrounds the Las Flores Adobe Ranch House (SDI-812/H), a standing structure listed on the NRHP and a designated National Historic Landmark. The Las Flores Adobe has been determined significant at the national level in the areas of architecture and social history and is significant at the local level for its association with a locally important lima bean farm (Schaefer 1992; SAIC 1996b, 1996c, 1998; Wee and Mikesell 1991).

The site overview has indicated the tested portion of the deposit does not meet criteria for listing on the NRHP because it lacks sufficient integrity to contribute to knowledge of prehistory or history. Note, however, that the presence of isolated small-scale historic features (e.g., privies) cannot be ruled out and archaeological monitoring of all future ground disturbances is recommended.

This report indicates the tested portion of the Locus B archaeological deposit lacks integrity and research potential because of the following:

- Prehistoric, historic and modern materials concentrate in the upper 40 cm of the deposit and have been thoroughly mixed by plowing, pipeline installation, previous construction activities, tree roots and rodent burrowing. It is not possible to segregate the cultural materials into culturally meaningful units of analysis.
- The historic assemblage does not contain information that increases knowledge of the social or economic life of ranch house inhabitants. No historic features, foundations, trash pits or dense concentrations of historic artifacts were found. Historic artifacts that could be assigned to significant historic periods were few in types and number and highly fragmented.
- Artifacts that can be linked to prehistoric occupation include shellfish remains, small amounts of Tizon Brownware pottery, debitage and flake tools. The current evaluation project has documented these materials to the point that further data recovery and analysis will not contribute additional important information.
- The faunal assemblage is relatively fragmented and consists of both native and introduced species. The introduced species can be attributed to historic occupation but cannot be assigned to periods of specific significance due to the brief span (1868-1888, 1888-1941) of those periods (Wee and Mikesell 1991). Moreover, due to mixing, it is not possible to conclusively segregate assemblages of native species used during prehistoric occupations from those used during historic occupations. It is not possible, therefore, to identify prehistoric or historic subsistence patterns from the archaeological data.

In summary, the tested portion of the Locus B archaeological deposit is not considered eligible for listing on the NRHP, either in its own right as a prehistoric component or as a contributing element associated with the historic occupation of the ranch house. However, isolated historic features could be present and ground disturbance within this area should be monitored by a qualified archaeologist.

It is important to note that the above determination of NRHP-eligibility does not extend to untested portions of the Locus B deposit, including those underneath the ranch house. Further testing may reveal intact prehistoric deposits beneath the floor of the ranch house.

## 18.3 FINDING OF EFFECT

Criteria of Effect state that "An undertaking has an effect on a historic property when the undertaking may alter characteristics of a property that may qualify the property for inclusion in the National Register (36 CFR 800.9[a])."

Provisions of 36 CFR 800.9(b), Criteria of Adverse Effect, continue: "... an undertaking is considered to have an adverse effect when the effect on the property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include but are not limited to:

1) Physical destruction, damage, or alteration of all or part of the property;
2) Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;

3) Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;

4) Neglect of a property resulting in its deterioration or destruction; or

5) Transfer, lease, or sale of the property."

The proposed project to flatten the grade immediately adjacent to the western perimeter of the ranch house will not have an effect on historic properties because the archaeological deposit in this area is not considered eligible for listing on the NRHP. Although this archaeological deposit is within the boundaries of an NRHP-listed site, the deposit lacks integrity and research potential and is not a contributing element.

## 18.4 MANAGEMENT RECOMMENDATIONS

This evaluation indicates that, although tested portions of the Locus B archaeological assemblage are not considered eligible for the NRHP, isolated historic features such as a privy could occur. While the upper 40-50 cm of such features would have been severely disturbed or destroyed by plowing, deeper deposits could be relatively intact. Therefore, we recommend that all ground disturbance deeper than 40 cm be monitored by a qualified archaeologist to ensure that any new discoveries are documented in accordance with the Section 106 compliance process (36 CFR 800). Because the ranch house has been and presumable will be used in the future by the Boy Scouts of America, we recommend that a Historic Property Treatment Plan be prepared to guide the management of the ranch house and its archaeological deposit.

# REFERENCES


Amick, D. S., and R. P. Mauldin. 1989. Comments on Sullivan and Rozen's "Debitage Analysis and Archaeological Interpretation." *American Antiquity* 54: 166-168.

Anderson, Scott. 1996. Pollen Analysis from Las Flores Creek, Camp Pendleton Marine Base, San Diego County. In *Coastal Archaeology of Las Flores Creek and Horno Canyon, Camp Pendleton, California*, edited by B. Byrd, pp. 57-68. ASM Affiliates Inc. Submitted to the U.S. Army Corps of Engineers, Los Angeles District.

Andrefsky, William. 1995. Cascade Phase Lithic Technology: An Example from the Lower Snake River. *North American Archaeologist* 16:95-115.

Arnold, J. 1992. Complex Hunter-Gatherer-Fishers of Prehistoric California: Chiefs, Specialists and the Maritime Adaptation of the Channel Islands. *American Antiquity* 57(1): 60-84.

ASM Affiliates. 1996. *Coastal Archaeology of Las Flores Creek and Horno Canyon, Camp Pendleton, California*. Submitted to the U.S. Army Corps of Engineers, Los Angeles District.

_____. 1997. *Coastal Archaeology at CA-SDI-10,728, Las Flores Creek, Camp Pendleton, California.* Submitted to the U.S. Army Corps of Engineers, Los Angeles District.

Bamforth, D. B. 1984. Analysis of Chipped Stone Artifacts. In *Archaeological Investigations on the San Antonio Terrace, Vandenberg Air Force Base, California, in Connection with the M-X Facilities Construction*. Chambers Consultants and Planners. Submitted to U.S. Army Corps of Engineers, Los Angeles District.

_____. 1991. Prehistoric Land Use: The Flaked Stone Evidence. In *Western Chumash Prehistory: Resource Use and Settlement in the Santa Ynez River Valley*, edited by C. F. Woodman, J. L. Rudolph, and T. P. Rudolph, pp. 185-245. Science Applications International Corporation, Santa Barbara.

Bamforth, D. B., G. R. Burns, and C. F. Woodman. 1990. Ambiguous Use Traces and Blind Test Results: New Data. *Journal of Archaeological Science* 17: 413-430.

Barton, C. M. 1988. *Lithic Variability and Middle Paleolithic Behavior: New Evidence from the Iberian Peninsula*. British Archaeological Reports (B.A.R.), International Series, No. 408. Oxford: British Archaeological Reports.

Bean, L.J., and F.C. Shipek. 1978. Luiseño. In R.F. Heizer, vol. ed., *Handbook of North American Indians*, Vol. 8: California: 550-563. Washington, D.C.: Smithsonian Institution.

Binford, L.R. 1979. Organization and Formation Processes: Looking at Curated Technologies. *Journal of Anthropological Research* 35: 255-273.

_____. 1980. Willow Smoke and Dogs' Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45(1): 1-17.

_____. 1982. The Archaeology of Place. In *Journal of Anthropological Archaeology* 1:5-31.

Bolton, H.E. 1927. *Fray Juan Crespi, Missionary Explorer on the Pacific Coast 1769-1774*. Berkeley: University of California Press.

Bornyasz, Mitchel. 1995. *Geomorphology and Site Disturbance Evaluation for Archaeological Sites CA-SDI-812/H and LP-3, San Diego County, California*. Department of Geological Sciences, San Diego State University.

Bowser, B. 1996. Analysis of Fish Remains. In *Coastal Archaeology of Los Flores Creek and Horno Canyon, Camp Pendleton, California*. Edited by B. Byrd, pp. 252-253. ASM Affiliates Inc. Submitted to the U.S. Army Corps of Engineers, Los Angeles District.

Brian F. Mooney Associates. 1994. *Research Design for Testing of CA-SDI-811, -4538, -10,726, and Site Relation and Condition Evaluation of CA-SDI-4536, -4417, -8435, and -10,731, Camp Pendleton, San Diego County, California*. Prepared for U.S. Army Corps of Engineers, Los Angeles District (Contract No. DACA-09-92-D0011, DO No. 19).

_____. 1995. *Archaeological Testing along San Mateo and San Onofre Creeks, Northwestern Camp Pendleton, San Diego County, California*. Submitted to the U. S. Army Corps of Engineers, Los Angeles District.

Brigandi, Phil. 1982. *A Brief History of Las Flores*. Revised 1995. Manuscript in possession of author.

Bull, Charles S. 1987. A New Proposal: Some Suggestions for San Diego Prehistory. In: San Dieguito-La Jolla: Chronology and Controversy. D. Gallegos, editor. *San Diego Archaeological Society Research Paper* 1: 35-41.

Burt, W. H., and R. P. Grossenheider. 1980. *A Field Guide to the Mammals. North America North of Mexico*. 3rd edition. The Peterson Field Guide Series. Boston: Houghton Mifflin.

Callahan, E. 1979. The Basics of Biface Knapping in the Eastern Fluted Point Tradition. *Archaeology of Eastern North America* 7:1-180.

Cameron, Constance. 1987. *Archaeological Investigations on the Rancho San Clemente, Orange Coutny, California*. Archaeological Research Facility, California State University, Fullerton.

Cerreto, Richard. 1988. Marine Invertebrate Analysis. In *Five Thousand Years of Maritime Subsistence at Ballast Point Prehistoric Site, SDI-48 (W-164), San Diego, California*, edited by D. Gallegos and C. Kyle. WESTEC Services Inc. Submitted to the Department of the Navy.

Christenson, Lynn E. 1990. *The Late Prehistoric Yuman Peoples of San Diego County, California: Their Settlement and Subsistence System.* Ph.D. dissertation. Arizona State University, Tempe.

_____. 1992. The Late Prehistoric Yuman Settlement and Subsistence System: A Coastal Adaptation. In *Essays on the Prehistory of Maritime California, Center for Archaeological Research, Davis.*

Colten, R. 1993. *Prehistoric Subsistence, Specialization, and Economy in a Southern California Chiefdom.* Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Los Angeles.

Connolly, T. J., and R. R. Musil. 1994. Patterns of Lithic Procurement and Reduction at the Newberry Crater Obsidian Quarries. In P.W. Baxter, Eds., *Contributions to the Archaeology of Oregon: 1989-1994,* pp. 89-117. Association of Oregon Archaeologists Occasional Paper, No. 5.

Costello, Julia Garvin. 1990. *Variability and Economic Change in the California Missions: An Historical and Archaeological Study.* University of California, Santa Barbara.

Cotterell, B., and J. Kamminga. 1987. The Formation of Flakes. *American Antiquity* 52: 675-708.

Crabtree, D. E. 1982. *An Introduction to Flintworking, 2nd edition.* Occasional Papers of the Idaho Museum of Natural History, No. 28. Pocatello: Idaho Museum of Natural History.

Culbert, Janet E. 1995. *Native American Uses of Southern California Vernal Pool Plants.* Masters thesis. Anthropology Department. San Diego State University.

Davis, E.L., C.W. Brott, and D.L. Weide. 1969. The Western Lithic Co-Tradition. *San Diego Museum Papers 6.*

Delorit, R.J. 1977. *Illustrated Taxonomy Manual of Weed Seeds.* River Falls: Agronomy Publications.

de Martini, E. 1969. A Correlative Study of the Ecology and Comparative Feeding Mechanisms of the Embiotocidae (Surfperches) as the Evidence of the Family's Adaptive Radiation into Available Ecological Niches. *Wasmann Journal of Biology* 27(2).

Drover, C.E., H.C. Koerper, and P. Langenwalter II. 1983. Early Holocene Human Adaptation on the Southern California Coast: A Summary Report of Investigations at the Irvine Site (CA-Ora-64), Newport Bay, Orange County, California. *Pacific Coast Archaeological Society Quarterly* 19(3&4): 1-84.

Drucker, Phillip. 1937. Culture Element Distributions, V: Southern California. *University of California Anthropological Records* 1(1):1-52.

Earle, David D., and Stephen O'Neil. 1994. *An Ethnohistoric Analysis of Population, Settlement, and Social Organization in Coastal Orange County at the End of the Late Prehistoric Period.* Keith Companies. Submitted to Coastal Community Builders, Newport Beach.

Ebeling, Walter. 1986. *Handbook of Indian Foods and Fibers of Arid America.* Berkeley: University of California Press.

Ehlig, P.L. 1977. *Geologic Report of the Area adjacent to the San Onofre Nuclear Generating Station, Northwestern San Diego County, California.* Prepared for Southern California Edison Company and San Diego Gas & Electric Company.

Eighmey, J. 1996. Technology and the Use of Flaked Stone Artifacts. In *Coastal Archaeology of Las Flores Creek and Horno Canyon, Camp Pendleton, California,* edited by B. F. Byrd, pp. 311-316. ASM Affiliates, Inc. Submitted to the U.S. Army Corps of Engineers, Los Angeles District.

Englehardt, Fr. Zephyrin. 1921. *San Luis Rey Mission.* San Francisco: The James H. Barry Company.

Ensor, H. B., and E. Roemer. 1989. Comments on Sullivan and Rozen's Debitage Analysis and Archaeological Interpretation. *American Antiquity* 54: 175-178.

Erlandson, Jon M. 1994. *Early Hunter-Gatherers of the California Coast.* New York: Plenum Press.

Eschmeyer, W.N., E.S. Herald, and Howard Hammann. 1983. *A Field Guide to Pacific Coast Fishes.* Boston: Houghton Mifflin Company.

Ezell, Paul. 1987. The Harris Site – An Atypical San Dieguito Site or Am I Beating a Dead Horse? In: *San Dieguito – La Jolla: Chronology and Controversy.* D. Gallegos, editor. San Diego County Archaeological Society Research Paper 1:15-22.

Follett, John. 1976. Fish Remains from an Archaeological Site at Rancho Carrillo on the Silver Strand, San Diego County, California. *Bulletin of the Southern California Academy of Sciences* 75(2):131-137.

Fiedel, S. J. 1996. Blood from Stones? Some Methodological and Interpretive Problems in Blood Residue Analysis. *Journal of Archaeological Science* 23:139-147.

Gibson, R.O. 1992. An Introduction to the Study of Aboriginal Beads from California. *Pacific Coast Archaeological Society Quarterly* 28(3).

Glassow, M., and L. Wilcoxon. 1988. Coastal Adaptation near Point Conception, California, with Particular Regard to Shellfish Exploitation. *American Antiquity* 53(1): 36-51.

Graham, William. 1981. *A Cultural Resource Survey of the Laguna Mountain Recreation Area, San Diego County, California.* ASM Affiliates Inc. Submitted to USDA, Forest Service, Cleveland National Forest, San Diego.

Grayson, Donald K. 1984 *Quantitative Zooarchaeology.* New York: Academic Press.

Griffen, J. 1942. A Doctor Comes to California, The Diary of John S. Griffin, Assistant Surgeon with Kearny's Dragoons, 1846-7, edited by G. Ames. *California Historical Society Quarterly* 21:2333-357.

Harrington, John P. 1933. Annotations. In *Chinigchinich: A Revised and Annotated Version of Alfred Robinson's Translation,* edited by P. Hanna. Santa Ana, California: Fine Arts Press.

_____. 1986. *The Papers of John Peabody Harrington in the Smithsonian Institution, 1907-1957, Vol. 3: Native American History, Language, and Culture of Southern California/Basin.* White Plains: Kraus International Publications.

Hayes, Benjamin. 1976. *Pioneer Notes from the Diaries of Judge Benjamin Hayes, 1849-1875.* New York: Arno Press.

Heizer, Robert F., and Albert B. Elsasser. 1980. *The Natural World of the California Indians.* Berkeley: University of California Press.

Hess, S. C. 1998. Flaked Stone Artifacts. In K. Rasmussen and C. Woodman, eds., *3,000 Years of Prehistory at the Red Beach Site, Marine Corps Base, Camp Pendleton, California,* pp. 91-154. Santa Barbara: Science Applications International Corporation.

_____. 1997. *Rocks, Range, and Renfrew: Using Distance-Decay Effects to Study Late Pre-Mazama Period Obsidian Acquisition and Mobility in Oregon and Washington.* Ph.D. Dissertation, Department of Anthropology, Washington State University, Pullman.

Hickman, J.C. editor. 1993. *The Jepson Manual of Higher Plants of California.* Berkeley: University of California Press.

Hudson, D. T., and T. C. Blackburn. 1982. *Food Procurement and Transportation,* vol. I. The Material Culture of the Chumash Interaction Sphere. Ballena Press Anthropological Papers No. 25. A Ballena Press/Santa Barbara Museum of Natural History Cooperative Publication, Los Altos and Santa Barbara.

Hudson, J., B. Bowser, and R. Huddleston. 1995. Analysis of Vertebrate Remains from SDI-13325, SDI-1074, SDI-4411, SDI-12754, and SDI-13748. In *Archaeological Testing along San Mateo and San Onofre Creeks, Northwestern Camp Pendleton, San Diego, California.* Edited by B. Byrd, pp. 129-146. Brian F. Mooney Associates. Submitted to the U.S. Army Corps of Engineers, Los Angeles District.

Hudson, J., B. Bowser, R. Lavenberg, and R. Huddleston. 1996. Vertebrate Remains from SDI-811, SDI-4538, and SDI-10726 at Camp Pendleton. In *Coastal Archaeology of Las Flores Creek and Horno Canyon, Camp Pendleton, California.* Edited by B. Byrd, pp. 241-274. ASM Affiliates, Inc. Submitted to the U.S. Army Corps of Engineers, Los Angeles District.

Ingbar, E. E., M. L. Larson, and B. A. Bradley. 1989. A Nontypological Approach to Debitage Analysis. In D. S. Amick, and R. P. Mauldin, Eds., *Experiments in Lithic Technology,* pp. 117-136. Oxford: British Archaeological Reports, International Series, No. 528.

Inman, D.L. 1983. Application of Coastal Dynamics to the Reconstruction of Paleocoastlines in the Vicinity of La Jolla, California. *Quaternary Coastlines and Marine Archaeology,* ed. P. Masters and N. Flemming, pp. 1-49. New York: Academic Press.

Iovin, J. 1963. A Summary Description of Luiseño Material Culture. *Archaeological Survey Annual Report 1962-1963,* pp. 82-130. Department of Anthropology and Sociology, University of California, Los Angeles.

Jameson, E.W., and H.J. Peeters. 1988. *California Mammals.* Berkeley: University of California Press.

Johnson, John R. 1998. *The Ethnohistorical Basis for Cultural Affiliation in the Camp Pendleton Marine Base Area.* Science Applications International Corporation. Submitted to the U.S. Army Corps of Engineers, Los Angeles District.

Jones, Olive, and Catherine Sullivan. 1985. *The Parks Canada Glass Glossary.* Studies in Archaeology and History. National Historic Parks and Sites Branch, Parks Canada.

Keeley, L. H. 1980. *Experimental Determination of Stone Tool Uses: A Microwear Analysis.* Chicago: The University of Chicago Press.

King, C.D. 1978. Protohistoric and Historic Archaeology. In Handbook of North American Indians, Vol. 8, *California,* edited by R. F. Heizer, pp. 58-68. Smithsonian Institution, Washington, D.C.

_____ . 1990. Evolution of Chumash Society: A Comparative Study of Artifacts Used for Social System Maintenance in the Santa Barbara Channel Region before A.D. 1804. In *The Evolution of North American Indians,* edited by D. Thomas. New York: Garland Publishing.

Koerper, H.C. 1981. *Prehistoric Subsistence and Settlement in the Newport Bay Area and Environs, Orange County, California.* Doctoral dissertation, University of California, Riverside.

Kroeber, Alfred L. 1925. Handbook of the Indians of California. *Bureau of American Ethnology Bulletin* 78. Washington, D.C.

_____ . 1970. *Handbook of the Indians of California.* Berkeley: California Book Company.

Landberg, L.C.W. 1965. The Chumash Indians of Southern California. *Southwest Museum Papers* 19. Los Angeles.

Laylander, Don. 1992. *Research Issues in San Diego Archaeology.* San Diego County Archaeological Society.

Love, M. 1996. *Probably More Than You Want to Know about the Fishes of the Pacific Coast: A Humorous Guide to Pacific Fishes.* Santa Barbara: Really Big Press.

Luedtke, B. E. 1992. *An Archaeologist's Guide to Chert and Flint.* Archaeological Research Tools, No. 7. Los Angeles: University of California Institute of Archaeology.

Lyneis, Margaret M. 1988. Tizon Brown Ware and the Problems Raised by Paddle-and-Anvil Pottery in the Mojave Desert. *Journal of California and Great Basin Anthropology* 10(2):146-155.

Magne, M., and D. Pokotylo. 1981. A Pilot Study in Bifacial Lithic Reduction Sequences. *Lithic Technology* 10: 34-47.

Martin, Alexander C., and William D. Barkley. 1961. *Seed Identification Manual.* Berkeley: University of California Press.

Maxwell, Pamela J. 1994. *Research Design: Historic and Archaeological Resources Protection Plan, United States Marine Corps Base, Camp Pendleton, California.* Prepared by the U.S. Army Corps of Engineers, Los Angeles District.

McCawley, William. 1995. *Ethnohistoric Report. Results of Archaeological Significance Testing at Site CA-SDI-10156/SDI-12599/H MCAS Camp Pendleton, San Diego County, California, Vol. 2.* LSA Associates Inc. Submitted to the Department of the Navy, Marine Corps Air Station, El Toro.

_____. 1996. *From Rancheria to Rancho: The Ethnohistory of Topamai - Rancho Santa Margarita, CA-SDI-10156/12599/H.* Paper presented at the Annual Meeting of the Society for California Archaeology, Bakersfield.

Meighan, Clement W. 1954. A Late Complex in Southern California Prehistory. *Southwestern Journal of Anthropology* 10(2): 215-227.

Minerals Management Service (MMS), U.S. Department of the Interior. 1987. *Ecology of Important Fisheries Species Offshore California.* OCS Study MMS 86-0093.2.

Moratto, Michael J. 1984. *California Archaeology.* New York: Academic Press.

Moriarty, James R. III. 1966. Culture Phase Divisions Suggested by Typological Change Coordinated with Stratigraphically Controlled Radiocarbon Dating at San Diego. *Anthropological Journal of Canada* 4(4): 20-30.

_____. 1967. Transitional Pre-Desert Phase in San Diego County, California. *Science* 155(3762): 553-556.

Morris, P. A. 1980. *A Field Guide to Pacific Coast Shells* (2nd ed.). Boston: Houghton Mifflin Co.

Morris, R.H., D.P. Abbott, and E.C. Haderlie. 1980. *Intertidal Invertebrates of California.* Stanford: Stanford University Press.

Moyle, W.R. Jr. 1973. *Geologic Map of Western Part of Camp Pendleton, Southern California.* U.S. Geologic Survey Open File Report. Scale 1:48,000".

Munz, P.A. 1974. *A Flora of Southern California.* Berkeley: University of California Press.

Musil, Albina F. 1963. Identification of Crop and Weed Seeds. *Agricultural Handbook No. 219.* Washington, D.C.: U.S. Department of Agriculture.

Newman, M. E., H. Ceri, and B. Kooyman. 1996. The use of immunological techniques in the analysis of archaeological material - a response to Eisele; with report of studies at Head-Smashed-In Buffalo Jump. *Antiquity* 70:677-682.

O'Connell, James F. 1987. Alyawara Site Structure and Its Archaeological Implications. *American Antiquity* 52(1): 74-108.

Odell, G. H. 1989. Experiments in Lithic Reduction. In D. S. Amick and R. P. Mauldin, Eds., *Experiments in Lithic Technology*, pp. 163-198. B.A.R. International Series, No. 528. Oxford: B.A.R.

Palmer, M.A. 1990. *Hydrologic Investigation of Las Flores Basin, San Diego County, California.* Unpublished M.A. thesis, San Diego State University.

Peterson, R. (1990). *A Field Guide to Western Birds.* Boston: Houghton Mifflin Co.

Pigniolo, A. R. 1992. *Distribution of Piedra de Lumbre "Chert" and Hunter-Gatherer Mobility and Exchange in Southern California.* Master's Thesis, Department of Anthropology, San Diego State University, California.

Raab, M.L., and A. Yatsko. 1990. Prehistoric Human Ecology of *Quinquina*, a Research Design for Archaeological Studies on San Clemente Island, Southern California. *Pacific Coast Archaeological Society Quarterly* 26(2/3): 10-37.

Reddy, S. N. 1996. A Review of *Donax Gouldii* (Bean Clam) Ecology and Behavior in San Diego County. In *Coastal Archaeology of Las Flores Creek and Horno Canyon, Camp Pendleton, California*, edited by B. Byrd, pp. 23-31. ASM Affiliates, Inc. Submitted to the U. S. Army Corps of Engineers, Los Angeles District.

Reddy, S., and B. Byrd. 1997. *A Window to the Past: Designing Archaeological Study on Camp Pendleton, California.* ASM Affiliates Inc. Submitted to the U.S. Army Corps of Engineers, Los Angeles District.

Redman, C.L. 1987. Surface Collection, Sampling, and Research Design. *American Antiquity* 52(2): 249-265.

Rehder, H.A. 1995. *The Audubon Society Field Guide to North American Seashells.* New York: Alfred A. Knopf, Inc.

Renfrew, C. 1977. Alternative Models for Exchange and Spatial Distribution. In T.K. Earle and J. E. Ericson, Eds., *Exchange Systems in Prehistory*, pp. 71-90. New York: Academic Press.

Riedman, M. 1990. *The Pinnipeds.* Berkeley: University of California Press.

Rivers, Betty. 1991 *The Pendleton Coast District: An Ethnographic and Historical Background. In The Cultural Resources of the Pendleton Coast District.* Ms. on file at SAIC, Santa Barbara, California.

Robinson, A. 1969. *Life in California: During a Residence of Several Years in that Territory, Comprising a Description of the Country and the Missionary Establishments (1846)*, edited by Doyce Nunis, Jr. New York: DeCapo Press.

Rogers, Malcolm J. 1936. *Yuman Pottery Making.* San Diego Museum Papers No. 2.

_____ . 1945. An Outline of Yuman Prehistory. *Southwestern Journal of Anthropology* 1: 167-198.

Rosenthal, Jane, and Beth Padon. 1994. *Testing Plan for Determination of Eligibility and Evaluation of Project Impacts: Archaeological Site, CA-SDI-812H, Marine Corps Base, Camp Pendleton, San Diego County, California.* Prepared for Southwest Division, Naval Facilities Engineering Command (Contract No. N68711-94-M-1730) by Petra Resources, Inc. Irvine, California.

Schaefer, Jerry. 1992 *Las Flores Estancia National Register of Historic Places Registration Form.* Document on file at the U.S. Army Corps of Engineers, Los Angeles District, California.

Science Applications International Corporation (SAIC). 1991. *Western Chumash Prehistory: Resource Use and Settlement in the Santa Ynez River Valley.* Santa Barbara: Science Applications International Corporation.

_____. 1995. *Management Summary, CA-SDI-811, Marine Corps Base, Camp Pendleton, San Diego County, California, Preliminary Results of Extended Archaeological Survey.* Report prepared for U.S. Army Corps of Engineers, Los Angeles District (Contract No. DACA 63-95-D-0020, Delivery Order No. 0015).

_____. 1996a. *Extended Archaeological Survey at Sites CA-SDI-812/H, LP-1, LP-2, and LP-3 (CA-SDI-10723), Marine Corps Base, Camp Pendleton, San Diego County, California.* Science Applications International Corporation. Submitted to the U.S. Army Corps of Engineers, Fort Worth District.

_____. 1996b. *Management Summary: CA-SDI-812/H, Marine Corps Base, Camp Pendleton, San Diego County, California, Preliminary Results of Test Excavations and a Determination of NRHP Eligibility.* Science Applications International Corporation. Submitted to the U.S. Army Corps of Engineers, Fort Worth District.

_____. 1996c. *Finding of Effect: Sewage Effluent Compliance Project, Las Pulgas and San Mateo Areas.* Science Applications International Corporation. Submitted to the U.S. Army Corps of Engineers, Fort Worth District.

_____. 1998. *3,000 Years of Prehistory at the Red Beach Site, Marine Corps Base, Camp Pendleton, California.* Submitted to the U.S. Army Corps of Engineers, Fort Worth District. Santa Barbara: SAIC.

Shaffer, B., and J. Sanchez. 1994. Comparisons of 1/8"- and 1/4"- Mesh Recovery of Controlled Samples of Small-to-Medium Sized Mammals. *American Antiquity* 59(3):525-530.

Shennan, S. 1990. *Quantifying Archaeology* (Revised ed.). San Diego: Academic Press, Inc.

Shipek, Florence C. 1977. *A Strategy for Change: The Luiseño of Southern California.* Ph.D. Dissertation, Department of Anthropology, University of Hawaii.

Shott, M. J. 1994. Size and Form in the Analysis of Flake Debris: Review and Recent Approaches. *Journal of Archaeological Method and Theory* 1: 69-110.

Sparkman, Philip S. 1908. The Culture of the Luiseño Indians. *University of California Publications in American Archaeology and Ethnology* 8(4): 187-234.

SPSS. 1996. *Systat® 6.0 for Windows®: Statistics.* SPSS, Inc., Chicago.

Stebbins, R. 1985. *A Field Guide to Western Reptiles and Amphibians* (2nd ed.). Boston: Houghton Mifflin Co.

Stephenson, Terry E. 1936. *Forster vs. Pico, A California Cause Celebre.* Santa Ana, California: Fine Arts Press.

Strong, William D. 1929. *Aboriginal Society in Southern California.* Berkeley: University of California Press.

Sullivan, A. P., and K. C. Rozen. 1985. Debitage Analysis and Archaeological Interpretation. *American Antiquity* 50: 755-779.

Tomka, S. A. 1989. Differentiating Lithic Reduction Techniques: An Experimental Approach. In D. S. Amick and R. P. Mauldin, Eds., *Experiments in Lithic Technology,* pp. B.A.R. International Series, No. 528. Oxford: B.A.R.

True, D.L. 1966. *Archaeological Differentiation of Shoshonean and Yuman Speaking Groups in Southern California.* Ph.D. dissertation, Los Angeles: University of California, Department of Anthropology.

_____. 1970. Investigation of a Late Prehistoric Complex in Cuyamaca Rancho State Park, San Diego County, California. *University of California, Los Angeles, Archaeological Survey Monographs* 1.

True, D.L., C.W. Meighan, and H. Crew. 1974. Archaeological Investigations at Molpa, San Diego County, California. *University of California Publications in Anthropology* 11.

True, D.L., and Georgie Waugh. 1982. Proposed Settlement Shifts during San Luis Rey Times, Northern San Diego County. *Journal of California and Great Basin Anthropology* 4(1):34-54.

U.S. Department of Agriculture, Soil Survey Staff (USDA). 1992. *Keys to Soil Taxonomy.* Fifth edition. Soil Management Support Services Technical Monograph 19. Blacksberg, Virginia: Pocahontas Press.

Warren, Claude N. 1987. San Dieguito and La Jolla: Some Comments. In: San Dieguito-La Jolla: Chronology and Controversy, edited by D. Gallegos. *San Diego County Archaeological Society Research Paper* 1: 73-85.

Weber, Msgr. Francis J. 1988. *El Caminito Real, A Documentary History of California's Estancias.* Hong Kong: Yee Tin Tong Printing Press, Ltd.

Wee, Stephen R., and Stephen D. Mikesell. 1991. *Las Flores Adobe, National Register of Historic Places Registration Form.* Davis, California: Jackson Research Projects.

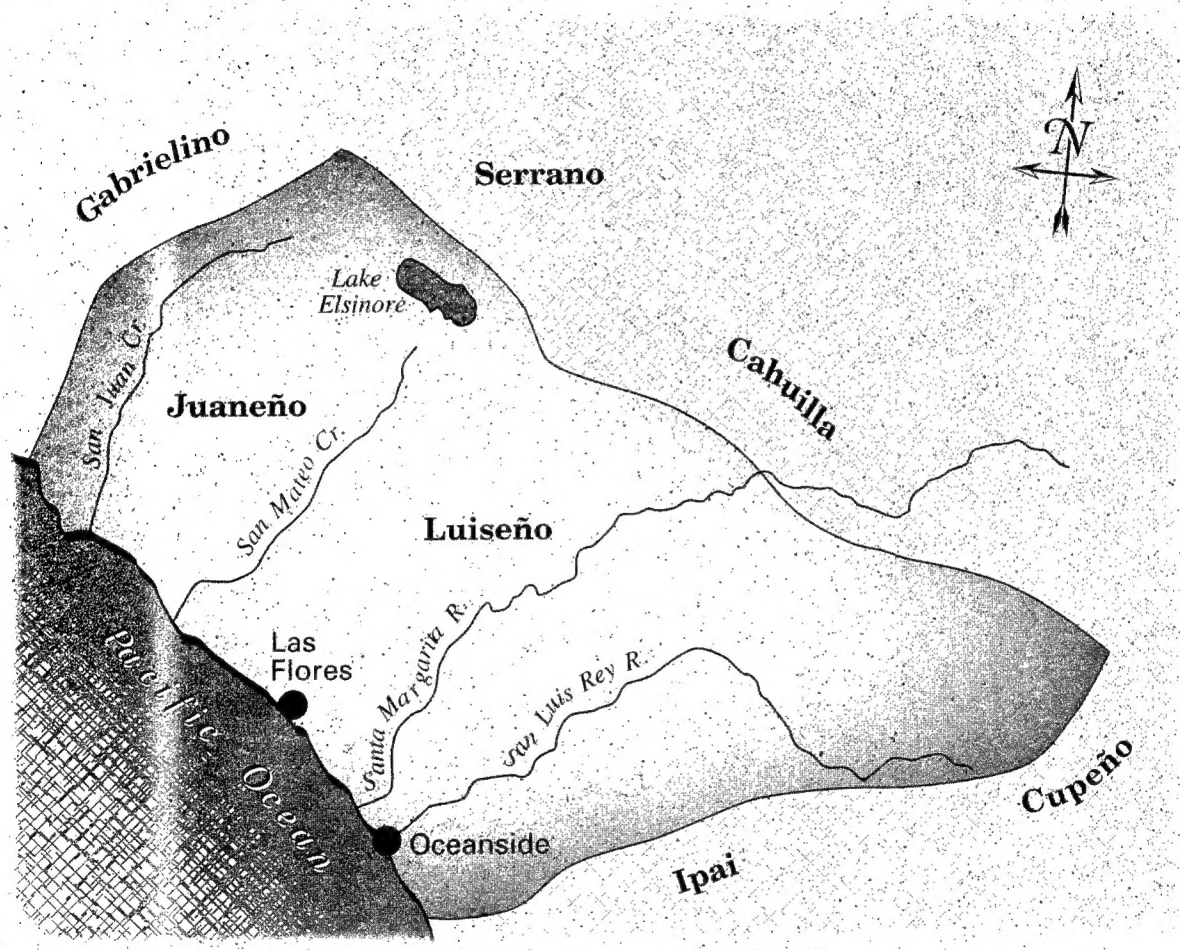
White, Raymond C. 1963. Luiseño Social Organization. *University of California Publications in American Archaeology and Ethnology* 48(2): 91-194. Berkeley.

Wilcoxon, Lawrence R., Rebecca Conard, Thomas Rockwell, and Julia G. Costello. 1986. *A Phase 2 Cultural Resource Evaluation, Boeseke Ranch, Montecito, California.* On file at the Central Coast Information Center, University of California, Santa Barbara.

Wilken, Michael. 1968. The Paipai Potters of Baja California: A Living Tradition. *Masterkey* 60(4):18-26.

Wilson, R. L. 1981. *Bottles on the Western Frontier.* Tucson: University of Arizona Press.

Wood, R. W., and D. L. Johnson. 1978. A Survey of Disturbance Processes in Archaeological Site Formation. *Advances in Archaeological Method and Theory* 1: 315-381.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